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Red-Cockaded Woodpecker

Status and Management in the Southern Region in 1986

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RED-COCKADED WOODPECKER
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June 1989

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NOTE TO READERS

Red-cockaded woodpecker population surveys, habitat analysis and management practices, and research have continued and indeed increased in many populations since the original data collection effort for this report was initiated in 1986. Therefore, some Districts and Forests may have updated population or habitat data that does not completely agree with information in this report. We recognize that increased management efforts will continuously refine and improve data bases. This report should serve as a baseline document for "where we were in 1986". By comparing present and future population and habitat data to this report we can measure the status and successes of our management programs. annual reports will provide an opportunity to update any information presented in this document.

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I. *INTRODUCTION*

A. *General*

Perhaps foremost in the minds of red-cockaded woodpecker (RCW) managers and researchers is the question concerning the status of the nation's RCW population. Although RCW researchers continue to document local population declines, a general confusion seems to exist concerning the status and health of the RCW population on a Regionwide basis. This confusion is understandable when seen from the viewpoint of a manager responsible for a particular Forest or District RCW population, where the birds are indeed "locally common." Similarly, other managers and biologists have witnessed steady declines in their RCW populations, some to the point of extirpation.

In an effort to gather standardized data, answer important questions and address some of the issues concerning RCW conservation, the USDA Forest Service (FS) Southern Region Threatened and Endangered Species Program initiated a Regionwide survey to collect RCW information at the ranger district level. Specifically, the objectives of assimilating a Regional RCW data base are as follows:

1. describe the current status and trend of RCW populations;

2. determine the past and present intensity and quality of population monitoring programs;

3. determine availability, current status, and habitat improvement needs for RCW nesting and foraging habitat;

4. examine the extent of RCW Chapter (FSH 2609.23R) implementation; and

5. identify funding necessary to achieve identified Forest population goals.

Information gathered from the survey will be used to identify:

1. RCW program direction;

2. management priorities;

3. targets and goals for nesting and foraging habitat;

4. RCW population survey and monitoring system;

5. budget requirements; and

6. additional data needs.

This report summarizes the findings of the Regional RCW Survey completed in 1987 by all Region 8 Forest Service Districts having RCW colonies. A historical perspective summarizing what has happened in RCW management since 1970 is included in the Introduction.

B. *Historical Perspective*

The first decade of scientific concern over the RCW began with the identification of the species as rare and endangered in 1968 and ended in 1980 with a rangewide turvey of its population on National Forest System lands. After the 1968 rare and endangered publication and prior to the 1980 survey, a RCW symposium proceedings was published, and a RCW recovery plan and FS Habitat Management Handbook RCW amendment were written, approved and implemented in an effort to better manage the RCW and its associated habitat.

The RCW was identified as a rare and endangered species in 1968 (USDI 1968), and was officially listed endangered in 1970 (Federal Register 35:16047). As a means of gathering current information on the species, the USDI Fish and Wildlife Service (FWS) and Tall Timbers Research Station sponsored a symposium, The Ecology and Management of the Red-cockaded Woodpecker (Thompson 1971). The symposium proceedings summarized most of the available knowledge on the species, including life history and ecology, habitat requirements, compatible timber management practices and population status.

The RCW received federal endangered species protection with the passage of the Endangered Species Act (ESA) in 1973. Following that listing, the FS in July 1975 amended its Wildlife Habitat Management Handbook to include a chapter (420) on management of the RCW (USDA 1975). Under authorities of the ESA, the FWS approved a RCW Recovery Plan (USDI 1979) in 1979. This recovery plan was completed in cooperation with representatives from academic, independent research, private industry, and state and federal agencies, including the FS. This comprehensive plan documents the former and then current status of the species and highlights reasons for population declines. Life history, population dynamics and habitat preferences of the species are also discussed. In addition, recommended actions to facilitate the species recovery and an implementation schedule for the recovery plan are included.

Following approval of the recovery plan, the FS in October 1979 revised its Wildlife Habitat Management Handbook Chapter 420 on management of the RCW (USDA 1979). The revised handbook chapter, in addition to discussing the species habitat requirements, expanded the guidelines for the standard management practices deemed necessary to ensure the species' continued survival. Recognizing that implementation of the newly revised handbook guidelines would not be appropriate without knowledge of individual Forest populations, the FS participated in the 1980 rangewide RCW survey.

As part of this survey, 17 National Forests were systematically sampled to determine a RCW population estimate. Approximately 10 percent of the compartments with suitable RCW habitat were 100 percent traversed between 1980 and 1982. Four Forests with RCW habitat were not sampled in this survey: Croatan, Daniel Boone, Oconee, and Ouachita National Forests. The FS population estimate based on this survey was 2121 + 405 active colonies. This is approximately 70 percent of the active colonies found on all federal lands during the 1980 rangewide survey (Lennartz, et. al. 1983). In an analysis of FS RCW habitat using CISC data, 2026 RCW colonies (status unknown) were known in 1980 (Hamel 1980).

Conservation of the RCW in the 1980's remains a priority for State and Federal natural resource agencies, interested members of the academic and scientific field and non-profit conservation and environmental organizations. To date, the major scientific documents of the 1980's dealing with the conservation and management of the RCW have mirrored the documents of the 1970's. In 1983, the Red-cockaded Woodpecker Symposium II (Wood 1983) was held in Florida. This Symposium, like the previous one, brought together the current knowledge of the RCW. Symposium co-sponsors included the Florida Game and Fresh Water Fish Commission, USDI Fish and Wildlife Service, and USDA Forest Service.

In 1985, the FWS issued an approved revision of the 1979 Red-cockaded Woodpecker Recovery Plan (USDI 1985). The 1985 revision was prepared cooperatively by the FS and the FWS. This recovery plan identified a series of RCW populations needed for recovery. Twelve out of the 15 RCW recovery populations identified are on National Forests. Anticipating the need to meet Region 8's responsibility for contributing to the recovery of the RCW, as outlined in the revised recovery plan, the FS revised its habitat management handbook guidelines for the RCW in March 1985 (USDA 1985). In addition to expanding on the habitat requirements and standard management practices outlined in the 1980 handbook amendment, the revised chapter identified the Forest RCW population objectives and established detailed guidelines for nesting habitat management.

Interest in the RCW has remained high in the 1980's and will likely increase as more and more demands are placed on public land, where the majority of the remaining birds occur. Government and academic researchers continue to investigate the ecology, life history, and habitat requirements of the species throughout its range. Realizing that conservation of the RCW involves more than an understanding of the bird's life history and ecology, scientists and managers have expanded their investigations in the 1980's to include a range of issues. Technical papers dealing with the economics, biopolitics, and federal agency management philosophies of RCW conservation are increasing in number. In 1986 a committee of the American Ornithologists' Union wrote an indepth report evaluating the Red-cockaded Woodpecker Recovery Plan and the Forest Service Wildlife Habitat Management Handbook chapter on the RCW (Ligon, et. al. 1986). sanagement of the RCW was a major issue in the Final Environmental Impact Statement for suppression of the Southern Pine Beetle, approved by the FS in 1987. The reports, surveys, studies and publications of the 1980's have, in addition to broadening our knowledge of the RCW, raised many unanswered questions and identified numerous valid concerns about the conservation and management of the species.

II. *METHODS*

We decided that the most efficient way to gather RCW data across the Region was to send a questionnaire to each National Forest. To assure standard data collection and facilitate computer analysis, a standard blank data sheet and a set of instructions on how to complete the data sheet were developed. The data sheet includes 65 questions grouped into the following 7 sections: General (8 questions); RCW Population Data (15 questions); Population Monitoring (7 questions); RCW Habitat Data (11 questions); RCW Habitat Management (6 questions); Handbook Implementation (13 questions); and Other (5 questions and comments). A copy of the RCW data sheet is included in Appendix I. A list of the respondents and their phone numbers is also included in Appendix I.

The RCW data sheet was transmitted via Data General to each Forest Supervisor's Office administering lands within historic RCW range. Each District was asked to complete a separate data sheet. Districts not having suitable RCW habitat were asked to complete only the General and RCW Population Data sections of the data sheet. Respondents were instructed to use existing sources of information, use "unknown" as a valid answer, and use percent figures when an answer was an estimate. The data sheet information should reflect the current District RCW data base and describe the information base used for RCW management in the Region.

Fifty completed data sheets with existing or historic RCW occupancy information were returned and loaded into an Appleworks computer data base using an Apple II series computer. The 11 data sheets submitted as negative replies were not loaded into the data base. All the information included on the data sheet, except the narrative comments in the Other section, were loaded. The data sheet data base is permanently stored on floppy disc and is available to anyone requesting it. All the completed data sheets are stored in Data General CEO archive files. Age class attachments not included in the District packages were accessed directly from the CISC data base at Fort Collins. Graphic outputs were completed using the Graph Works software. Correlation analysis and statistical descriptions were completed using the DAISY professional statistical software package.

III. *RESULTS*

The information reported in the RCW data sheet is presented here by data sheet section; General, RCW Population, Population Monitoring, RCW Habitat Data, RCW Habitat Management, Handbook Implementation, and Other. We have attempted to summarize the data from a Regional perspective. Unless otherwise noted, information presented is current through 1986. A summary of the RCW habitat
improvement funding is included as a separate section.

A. *General*

Sixty-six, or 62 percent of the total possible data sheets were submitted. All Districts with RCW habitat responsibilities identified in the Forest Service Handbook completed a data sheet. Forty-one Districts with existing or historic RCW populations, the Hitchiti Experimental Forest, and the Savannah River Forest Station responded with complete data sheets. Twenty-three Districts with historic RCW occupancy data, but without existing RCW populations, completed an abbreviated (sections A and B) data sheet. The 39 Districts that did not submit a data sheet are outside the RCW's currently occupied range and had no historical occupancy data in their records. A list of all the RCW populations by Forest, District, State and geographic province is included in Appendix II.

There are 23 RCW populations, with assigned FS population objectives, identified on National Forests in the Southern Region (USDA 1985). In addition, the Ocoee RD, Cherokee NF, and the Savannah River Forest Station have active colonies, but do not have FS population objectives. The Tombigbee RD, National Forests in Mississippi, and the Uwharrie RD, National Forests in North Carolina, lost their active colonies before the population objectives were established. Table 1 shows the number of FS RCW populations by State and geographic province. Eighty percent of the RCW populations occur in 6 states: Alabama, Florida, Mississippi, Louisiana, South Carolina, and Texas. Sixty percent of the recovery populations occur in three states: Alabama, Florida, and Mississippi. Over 70 percent of the RCW populations in the Southern Region occur in the Upper and Lower Coastal Plain Geographic Provinces, while 85 percent of the RCW recovery populations occur in these two provinces.

Table 1.--RCW population distribution

	Number of populations		*Percent of pop.*	
State	*Total*	*Recovery*	*Total*	*Recovery*
Alabama	5	3	20	25
Florida	3	2	12	17
Mississippi	3	2	12	17
Louisiana	3	1	12	8
South Carolina	3	1	12	8
Texas	3	1	12	8
Georgia	1	1	4	8
North Carolina	1	1	4	8
Arkansas	1	0	4	0
Kentucky	1	0	4	0
Tennessee	1	0	4	0
Total:	25	12		

	Number of populations		*Percent of pop.*	
Geographic province	*Total*	*Recovery*	*Total*	*Recovery*
Lower Coastal Plain	11	8	38	62
Upper Coastal Plain	10	3	34	23
Piedmont	3	2	10	15
Cumberland Plateau	2	0	7	0
Appalachian Highlands	1	0	3	0
Interior Highlands	1	0	3	0
Lower Thin Loess	1	0	3	0

Note: Savannah River Forest Station and Ocoee RD are included in this table. Populations may be found in more than one province.

B. *RCW Population Data*

Based on the District records there are 3,357 RCW colonies in the Southern Region. Thirty-nine Districts, the Hitchiti Experimental Forest, and the Savannah River Forest Station report 2,115 active RCW colonies in 1986. Table 2 shows the number of RCW colonies by State and geographic province. The States and geographic provinces are ranked in Table 2 by the number of reported active colonies. Almost 80 percent of the active colonies reported occur in four states: Florida, South Carolina, Louisiana, and Alabama. Ninety-six percent of the RCW colonies in the Southern Region are in the Upper and Lower Coastal Plain Geographic Provinces. Almost 70 percent of the RCW active colonies reported are in the Lower Coastal Plain.

Table 2.--RCW colony distribution

State	*Number of colonies* *Total*	*Active*	*Percent of total* *FS active colonies*
Florida	821	564	27
South Carolina	544	486	23
Louisiana	496	356	17
Alabama	529	239	11
Mississippi	324	192	8
Texas	479	188	9
North Carolina	92	50	2
Arkansas	20	20	<1
Georgia	23	12	<1
Kentucky	28	7	<1
Tennessee	1	1	<1
Totals:	3,357	2,115	

Geographic province	*Number of colonies* *Total*	*Active*	*Percent of total* *FS active colonies*
Lower Coastal Plain	2,106	1,441	68
Upper Coastal Plain	939	590	28
Lower Thin Loess	50	32	2
Piedmont	204	23	1
Interior Highlands	20	20	<1
Cumberland Plateau	37	8	<1
Appalachian Highlands	1	1	<1
Totals:	3,357	2,115	

Table 3 shows the number of RCW colonies and the number of active colonies for all the National Forests within the historic RCW range. The National Forests are ranked in Table 3 by the number of reported active colonies. Twenty National Forests, the Hitchiti Experimental Forest, and the Savannah River Forest Station report active RCW colonies. Four National Forests report having historic populations of RCW's, but no currently active colonies. Seven National Forests have had no known RCW colonies at any time. Almost 75 percent of the reported active colonies are found on four National Forests: Apalachicola NF, Francis Marion NF, Kisatchie NF, and Talladega NF.

Table 3.--RCW colonies, by Forest

	Number of colonies		Percent of total
National Forest	*Total*	*Active*	*FS active colonies*
Apalachicola	662	487	23
Francis Marion	509	483	23
Kisatchie	496	356	17
Talladega	467	206	10
Bienville	181	127	6
Sam Houston	241	112	5
Osceola	98	55	3
Croatan	67	50	2
Homochitto	65	40	2
Conecuh	51	32	1
Davy Crockett	114	30	1
DeSoto	75	25	1
Sabine	64	24	<1
Angelina	60	22	1
Ocala	61	22	1
Ouachita	20	20	<1
Chattahoochee-Oconee	23	12	<1
Daniel Boone	28	7	<1
Savannah River FS	21	3	<1
Bankhead	9	1	<1
Cherokee	1	1	<1
Uwharrie	25	0	0
Sumter	14	0	0
Tombigbee	3	0	0
Tuskegee	2	0	0
Delta	0	0	0
George Washington	0	0	0
Holly Springs	0	0	0
Jefferson	0	0	0
Nantahala	0	0	0
Ozark-St. Francis	0	0	0
Pisgah	0	0	0
Totals	3,357	2,115	

Table 4 shows the population objective, number of known colonies, number of identified active colonies, and the percent of the known colonies that are identified as active for each FS population. The populations are ranked in Table 4 by the number of reported active colonies. A District colony survey status summary is included in Appendix III. None of the FS populations are currently at or above their population objective. Nine FS RCW populations have population goals greater than or equal to 250 active colonies, six have population goals between 100 and 249 active colonies, four have population goals between 50 and 99 active colonies, and four populations have population goals of less than 50 active colonies (Figure 1). Three populations are above 250 reported active colonies, three populations are between 100 and 250 reported active colonies, three are between 50 and 100 reported active colonies, thirteen are below 50 reported active colonies, and five of the populations are now extinct (Figure 2). Four recovery populations are below 50 reported active colonies.

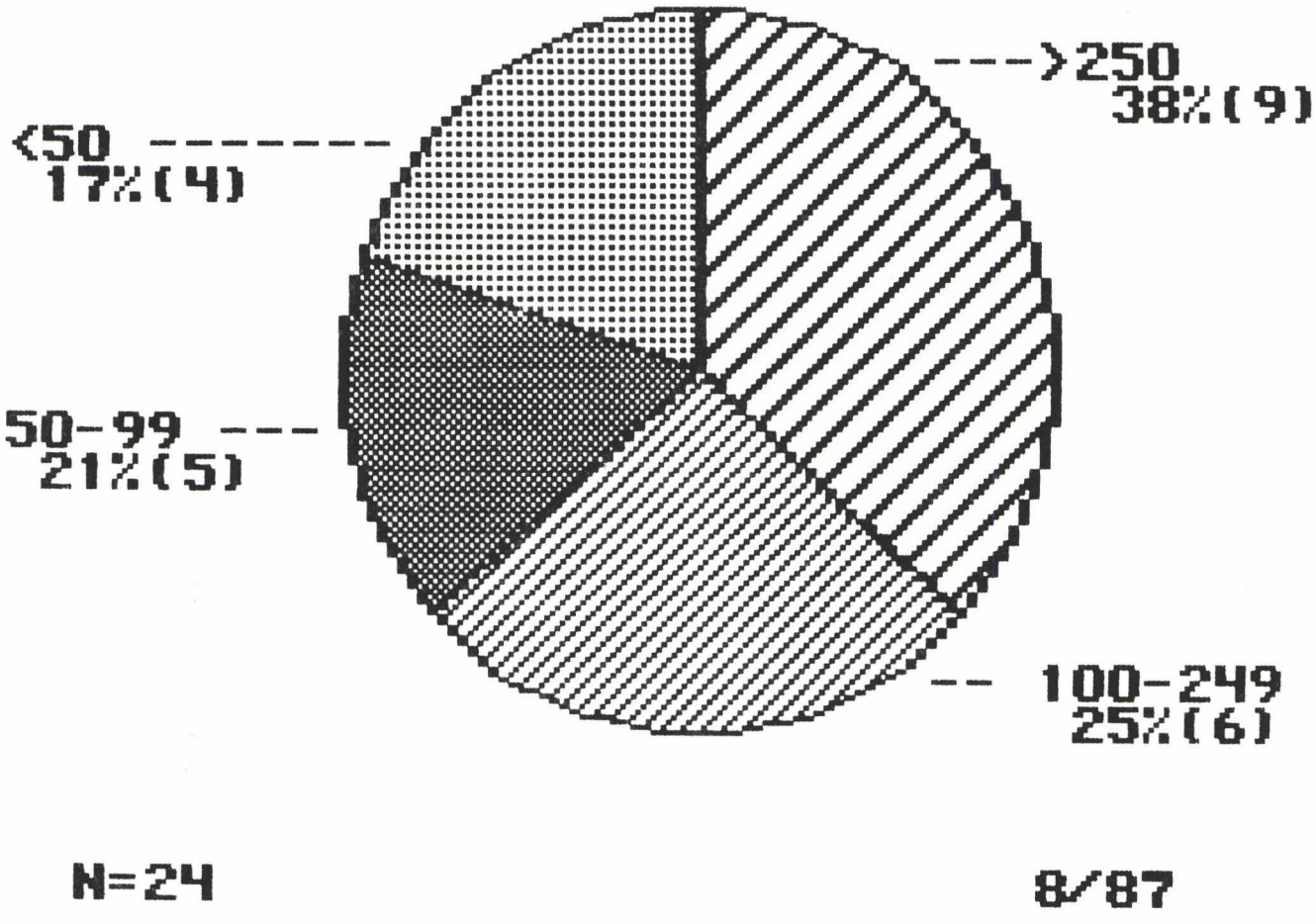
Table 4.--RCW population status

	Number of colonies			*Percent of*
Population	*Objective*	*Known*	*Active*	*Colonies active*
Apalachicola*	826	662	487	74
Francis Marion*	500	509	483	95**
Vernon, Evan.,Kisatchie*	400	366	274	77
Oakmulgee*	250	325	195	60
Bienville*	286	181	127	70
Sam Houston*	250	241	112	46
Catahoula-Winn	125	127	82	65
Osceola*	250	98	55	56
Croatan*	90	67	50	75
Angelina-Sabine	250	124	46	37
Homochitto	125	65	40	62
Conecuh*	125	51	32	63
Davy Crockett	125	114	30	26
DeSoto*	250	75	25	33
Ocala	138	61	22	36
Ouachita	36	20	20	100
Oconee*	50	23	12	52
Talladega*	125	145	11	8
Daniel Boone	50	28	7	25
Savannah River FS	40	21	3	5
Bankhead	50	9	1	11
Cherokee	NA	1	1	100
Uwharrie	NA	25	0	0
Sumter	10	10	0	0
Tombigbee	NA	3	0	0
Caney	20	3	0	0
Tuskegee	21	2	0	0
Totals	4,392	3,357	2,115	

* Recovery populations

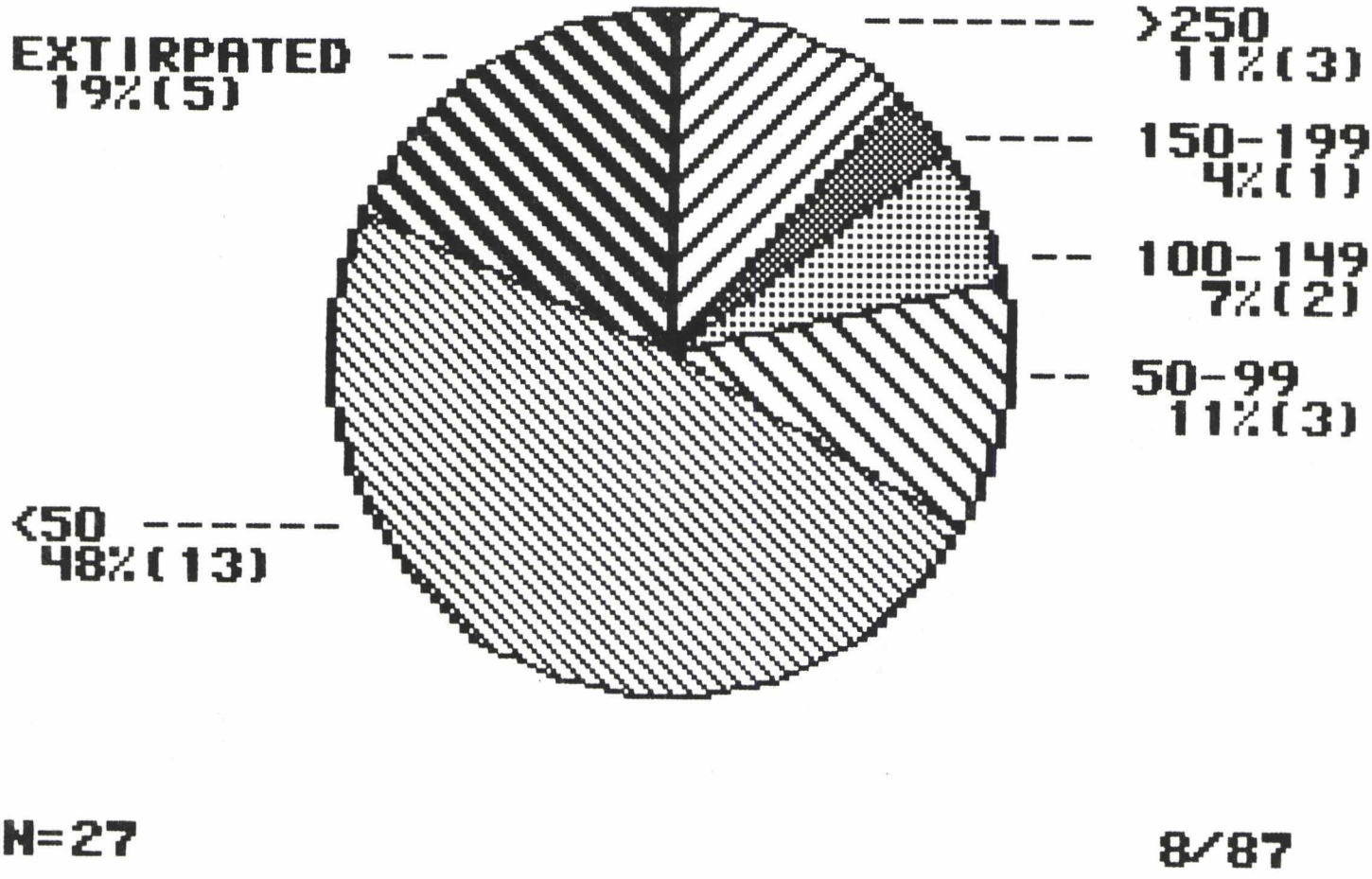
** 1980 survey percent active (95 percent) used by Districts for current population estimate

FIGURE 1 RCW POPULATION OBJECTIVES



NOTE: Figure 1 shows the relative proportion of the RCW populations by size of the identified population objective. Twenty-four populations are ranked into 5 size classes; e.g., 9 populations comprising 38 percent of the populations with a population objective have an objective greater than 250 active colonies.

FIGURE 2 RCW POPULATION SIZES



NOTE: Figure 2 shows the relative proportion of the RCW populations by number of active colonies (1986 survey data). Twenty-seven populations are ranked into 6 size classes; e.g., 3 populations comprising 11 percent of all the populations are greater than 250 active colonies.

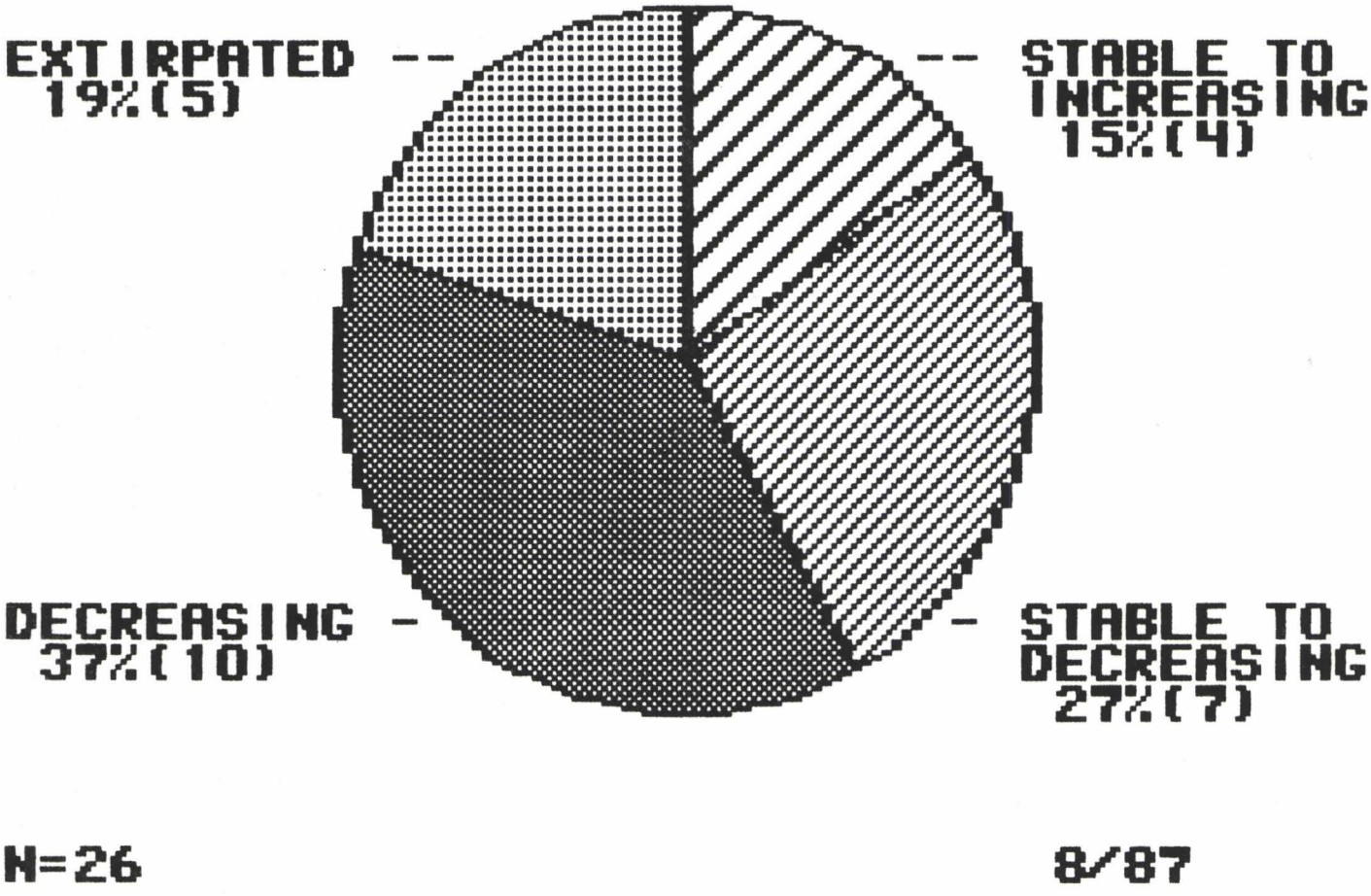
Population trend interpretations are shown in Table 5. Two indices of population trend in the data sheet information are included: (1) District opinion on their unit's current trends, and (2) trends in percent of colonies surveyed found to be active in actual District survey data. The RCW populations are ranked in Table 5 by the combination of these two indices. Four populations appear to be at least stable, seven populations are stable to possibly decreasing, 10 populations appear to be decreasing, and three populations have been extinct since 1980 (Figure 3). Three recovery populations are believed to be decreasing.

Table 5.--RCW population trends

Population	*District opinion*	*Percent active trend*	*Combined index*
Vernon/Evangeline/ Kisatchie	stable increasing	insufficient data	stable/increasing
Apalachicola*	stable	stable	stable
Francis Marion*	stable	stable	stable
Osceola*	stable	stable	stable
Croatan*	decreasing	stable	stable/decreasing
Oakmulgee*	stable	decreasing	stable/decreasing
Homochitto	decreasing	stable/decreasing	stable/decreasing
Conecuh*	stable	decreasing	stable/decreasing
DeSoto*	stable/decreasing	decreasing	stable/decreasing
Ouachita	stable/decreasing	stable	stable/decreasing
Oconee*	stable/decreasing	stable	stable/decreasing
Savannah River FS	decrease/augmented	decreasing	decrease/augmented
Bienville*	decreasing	decreasing	decreasing
Sam Houston*	decreasing	decreasing	decreasing
Catahoula-Winn	decreasing	decreasing	decreasing
Angelina-Sabine	decreasing	decreasing	decreasing
Davy Crockett	decreasing	decreasing	decreasing
Talladega*	decreasing	insufficient data	decreasing
Daniel Boone	decreasing	decreasing	decreasing
Bankhead	decreasing	decreasing	decreasing
Cherokee	decreasing	insufficient data	decreasing
Ocala**	increase/decrease	stable/decrease	increase-stable/ decrease
Uwharrie	extinct 1970's		
Sumter	extinct 1985		
Tombigbee	extinct 1970's		
Tuskegee	extinct 1985		
Caney	extinct 1986		

* Recovery Population
** Districts with contrasting trends

FIGURE 3 RCW POPULATION TRENDS



NOTE: Figure 3 shows the relative proportion of the RCW populations by population trend. Twenty-six populations are ranked into 4 trend classes; e.g., 4 populations comprising 15 percent of all the RCW populations exhibit stable to increasing population indices.

Districts use various methods to aggregate cavity trees into colonies. Twenty-eight (56 percent) Districts used the 1500 foot circle, as specified in the Wildlife Habitat Management Handbook. The remaining Districts employ a variety of methods, including subjective field mapping, 1/4 mile-circle, and actual nest site locations. Thirteen (26 percent) Districts reported using more than one system for colony identification, the most common combination being the 1500 foot circle and nest site locations. A District summary of colony aggregation methods is included in Appendix III. Twenty-six (52 percent) Districts indicated that some suitable RCW habitat has been systematically traversed for colonies. Eleven Districts (22 percent) have traversed more than 70 percent of their area, while five (10 percent) have completed 100 percent searches. A District summary of 100 percent traverse survey accomplishment is included in Appendix III. Eighty percent of the units reporting feel that their colony estimates are good to excellent.

Districts use several methods to determine colony status. Thirty-nine (78 percent) Districts use cavity characteristics, while the remaining Districts use presence of birds or confirmation of nesting. Twenty (40 percent) Districts use a combination of parameters, the most common being cavity characteristics and presence of birds. Forty-four (88 percent) Districts stated that their data on colony status was valid through 1985 or 1986. A District colony survey status summary is included in Appendix III. Ninety-one percent of the units reporting feel their estimates of active colonies are good to excellent.

Twenty-two percent of the FS RCW populations are less than 50 miles apart, 39 percent are 50 to 100 miles apart, and 39 percent are over 100 miles apart. Fifty percent of the units reporting identified that RCW colonies exist on adjacent lands within 20 miles of their active colonies, but very little is known about the number or status of these colonies. Twenty-four percent of the units reporting did not know if RCW colonies exist on adjacent lands. Five FS populations do have adjacent populations on other Federal properties that are over 20 active colonies in size. Active colonies on six intra-population Districts are now greater than 20 miles apart. An adjacent population summary by District is included in Appendix III.

C. *Population Monitoring*

District responses to population monitoring questions indicate colony survey intensity has increased during the past decade (Table 6). Since 1976, the number of Districts doing colony surveys has increased 300 percent, with thirty-five (85 percent) Districts examining colonies in 1986. In 1986, 939 (28 percent of all known colonies) colonies were surveyed; of these, 559 (60 percent of those examined) colonies were classified as active. Since 1976, an average of 66 percent of the total number of colonies surveyed have been active; ranging from 53 percent (1983) to 85 percent (1976). However, since 1981 the average percentage of colonies classified as active has apparently stabilized at approximately 59 percent (Table 6).

Table 6.--RCW survey summary by year

Year	*# Districts*	*Colonies surveyed*	*# Active*	*% Active*
1986	35	939	559	60
1985	33	876	507	58
1984	24	567	311	55
1983	32	1108	586	53
1982	24	584	365	63
1981	30	876	545	62
1980	25	582	386	66
1979	21	531	369	69
1978	18	541	378	70
1977	11	371	312	84
1976	11	239	203	85

Between 1970 and 1979, 87 colony surveys were completed on 31 Districts. Twenty-one Districts conducted at least two surveys during this 10-year period, while 10 Districts completed only one survey. Since 1980, 210 surveys on 42 Districts have been done. Table 7 summarizes how many surveys have been completed by how many Districts since 1980. Thirty-one (74 percent) Districts have conducted at least four surveys since 1980. A listing of all colony survey results is included in Appendix IV.

Table 7.--RCW surveys completed since 1980

Number of surveys completed	*Number of Districts*	*Percent of Districts*
1	4	10
2	2	5
3	5	12
4	9	21
5	5	12
6	6	14
7	11	26

In conjunction with increases in survey intensity, survey quality has also im- proved, as measured by the number of colonies visited, and the year of the most recent District survey. Twenty-nine (60 percent) Districts examined 100 percent of their colonies during their most recent surveys (Table 8). Seventeen (36 per- cent) Districts examined less than 50 percent of their colonies during their most recent surveys; however eight of those Districts have over 175 colonies to survey.

Table 8.--Percent of colonies surveyed in most recent survey

Percent of colonies surveyed	*Number of Districts*	*Percent of Districts*
100	29	60
75-99	2	4
50-74	0	0
<50	17	36

A large majority (82 percent) of Districts conducted their most recent RCW colony survey in 1986. Another 8 percent did their most recent survey in 1985. Table 9 summarizes the number of Districts and the year of their most recent RCW colony survey.

Table 9.--Year of most recent survey

Year	Number of *Districts*	Percent of *Districts*
1986	39	82
1985	4	8
1984	1	2
1983	1	2
1980	2	4
1978	1	2

Generally, actual observations of RCW's to confirm colony status, nesting activity and productivity trends, has not been a major component of most Districts' RCW program. Although 33 (80 percent) Districts report observing birds in either 1985 or 1986 during colony surveys, 23 (70 percent) of those Districts saw birds at 10 or less colonies. Eight (24 percent) Districts observed birds at 25 or more colonies during colony surveys. Only four Districts reported knowing clan size of some colonies in 1985 or 1986. Twenty-five Districts confirmed nesting at some of their RCW colonies. However, 20 (80 percent) of those Districts confirmed nesting at 10 or less colonies. Only three Districts report knowing the number of young fledged at some colonies in 1985 or 1986. A summary of the District colony monitoring results is included in Appendix IV.

District's report that at least 483,323 acres of potentially suitable habitat have not been surveyed for RCW's. This is approximately 14 percent of the total pine and pine-hardwood habitat available (Table 10). A District listing of unsurveyed acres is included in Appendix III.

Table 10.--Unsurveyed suitable RCW habitat .

Population	*Unsurveyed acres*	*Pine and pine hardwood acres*	*Percent unsurveyed*
Angelina-Sabine	yes	229,813	unknown
Apalachicola	46,900	256,803	18
Bankhead	0	76,670	0
Bienville	45,000	136,871	32
Caney	0	19,946	0
Catahoula-Winn	unknown	235,680	unknown
Cherokee	yes	78,671	100
Conecuh	0	59,739	0
Croatan	0	32,141	0
Daniel Boone	46,947	81,655	57
Davy Crockett	yes	140,744	unknown
DeSoto	12,000	363,605	3
Francis Marion	0	205,219	0
Homochitto	88,356	167,063	53
Oakmulgee	0	100,387	0
Ocala	yes	69,576	unknown
Oconee	6,500	76,528	8
Osceola	5,920	89,156	7
Ouachita	100,000	308,299	32
Sam Houston	95,400	131,350	73
Savannah River FS	0	133,277	0
Sumter	0	51,390	0
Talladega	10,000	118,645	8
Tombigbee	0	58,493	0
Tuskegee	0	6,218	0
Uwharrie	0	unknown	0
Vernon/Evang./Kis.	11,800	167,505	7
Totals	483,323	3,395,444	

D. *RCW Habitat Data*

The pine and pine-hardwood age class structure is shown in Table 11. The RCW populations in Table 11 are ranked by acres of pine and pine-hardwood forest type. Twenty-five population areas (>90 percent) have over 50 percent of the pine and pine-hardwood type in over 30 year age classes. Seven population areas (>28 percent) have more than 30 percent of the pine and pine-hardwood type over 60 years of age (Figure 4). Three population areas (12 percent) have habitats in which more than 10 percent of the pine and pine-hardwood type is over 80 years of age. Six populations (22 percent) are in habitats that will show substantial increases in the amount of pine and pine-hardwood type greater than 80 years of age in less than 10 years. About 60 percent of the populations will experience this increase in 10 to 20 years (Figure 5).

Table 11.--Pine/pine-hardwood age class structure

RCW population	*Pine/pine-hardwood acre*	*Percent by stand age* <30	30-60	60-80	>80	*Time lag in years**
DeSoto	363,605	25	55	19	1	10
Ouachita	308,299	28	16	48	8	0
Apalachicola	256,803	45	32	21	2	10
Catahoula-Winn	235,680	41	38	17	4	20
Angelina-Sabine	229,813	22	32	34	12	0
Francis Marion	205,219	35	53	10	2	0/30**
Vernon/Evang./Kis.	167,505	39	52	8	1	20
Homochitto	167,063	30	17	46	7	10
Davy Crockett	140,744	31	9	44	16	0
Bienville	136,871	25	57	16	2	20
Savannah River FS	133,277	43	54	3	<1	30
Sam Houston	131,350	32	21	37	10	0
Talladega	118,645	33	41	20	6	10
Oakmulgee	100,387	32	41	25	2	20
Osceola	89,156	34	46	20	<1	20
Daniel Boone	81,655	39	15	24	2	0
Cherokee	78,671	35	22	36	7	10
Bankhead	76,670	51	23	21	5	20
Oconee	76,528	37	44	17	2	20
Ocala	69,576	37	24	39	<1	10
Conecuh	59,739	39	59	2	<1	30
Tombigbee	58,493	36	48	15	1	20
Sumter	51,390	0	56	14	<1	20
Croatan	32,141	40	31	26	3	20
Caney	19,946	24	69	7	<1	40
Tuskegee	6,218	36	59	5	0	30
Total:	3,395,444					

*the period in years until the >80 age class significantly increases
**0 is longleaf pine and 30 is loblolly pine

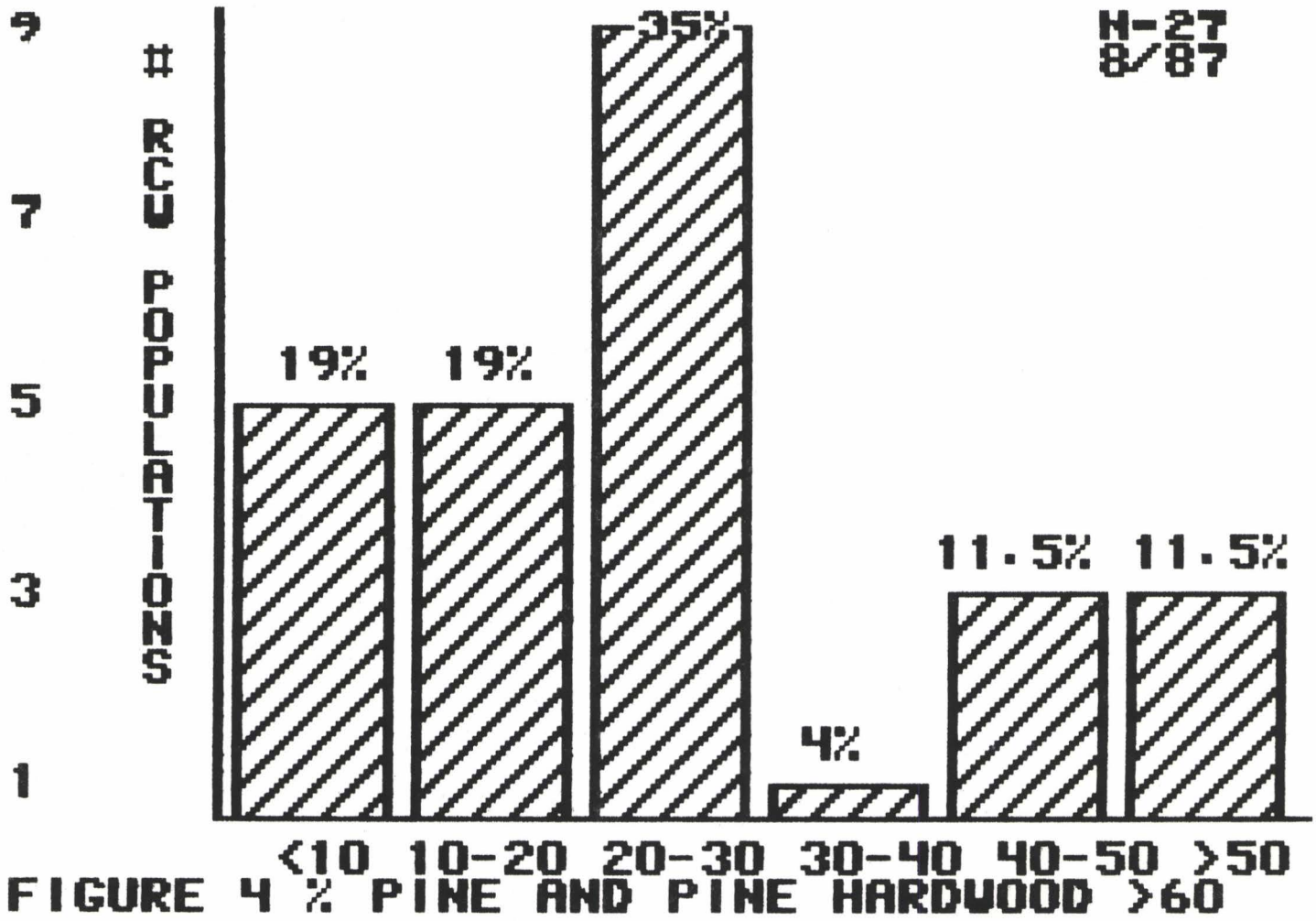


FIGURE 4 % PINE AND PINE HARDWOOD >60

NOTE: Figure 4 is a 3 variable bar graph showing the number and percent of the RCW populations in relation to the percent of the pine and pine-hardwood forest type greater than 60 years of age. For example, 5 RCW populations, comprising 19 percent of all the RCW populations, have less than 10 percent of their pine and pine-hardwood forest type greater than 60 years of age.

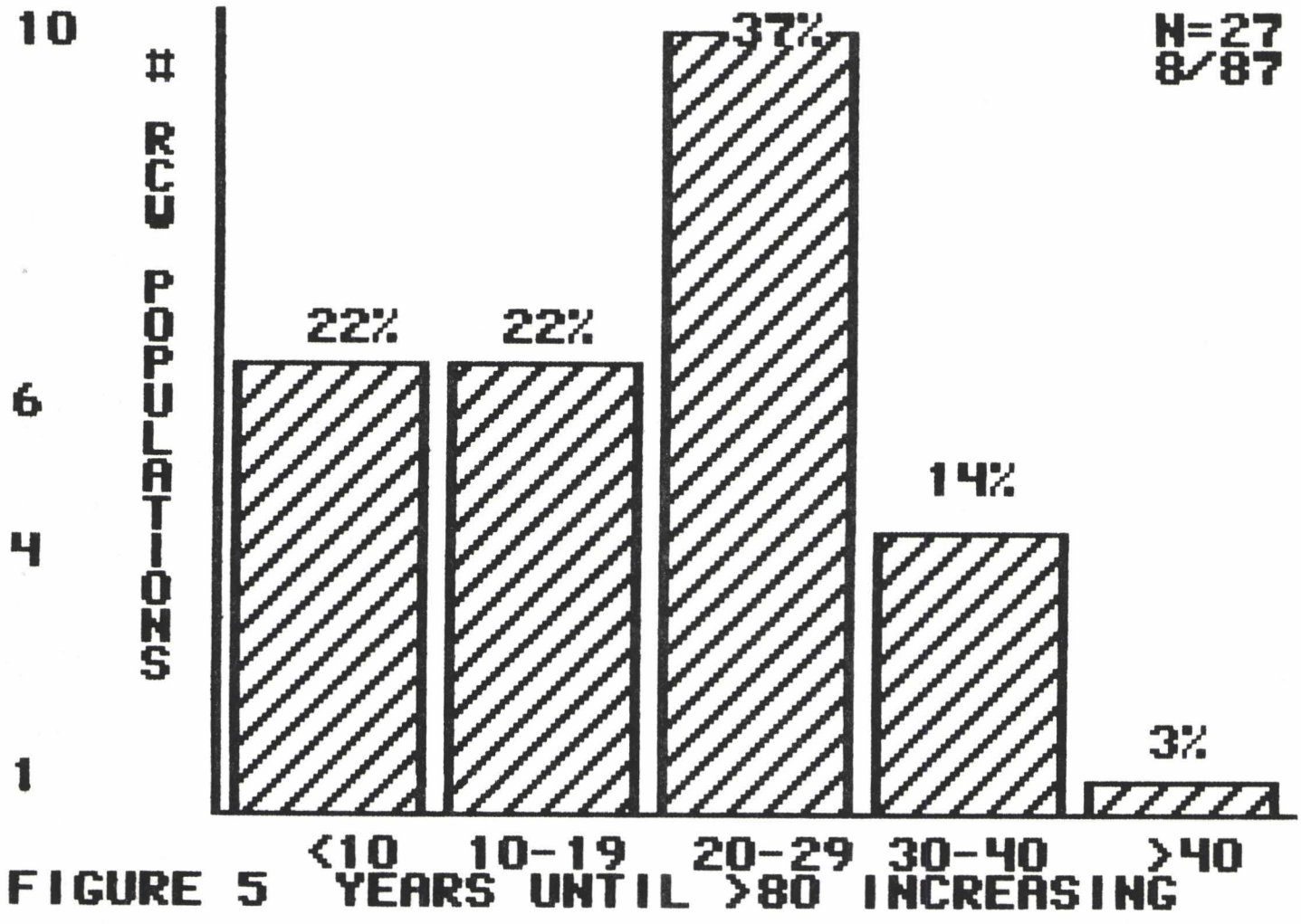


FIGURE 5

NOTE: Figure 5 is a 3 variable bar graph showing the number and percent of the RCW populations in relation to the number of years before the pine and pine-hardwood forest type greater than 80 years of age shows a substantial increase. For example, 6 RCW populations, comprising 22 percent of all the RCW populations, have less than 10 years until their pine and pine-hardwood greater than 80 years of age increases substantially.

Table 12 shows the dominate pine/pine-hardwood Forest type for each RCW population. The RCW populations in Table 12 are ranked by acres of pine and pine-hardwood forest type. Loblolly pine is the dominate forest type in 17 (65 percent) RCW population areas. Longleaf pine is the dominate forest type in five (19 percent) RCW population areas, but is represented as a forest type in 16 (62 percent).

Table 12.--Pine/pine-hardwood forest types

RCW population	*Pine/pine-hardwood acres*	Dominate Forest Type *name*	*acres*	*Longleaf acres*
DeSoto	363,605	longleaf pine	173,994	173,994
Ouachita	308,299	shortleaf pine	293,398	0
Apalachicola	256,803	slash pine	136,877	115,253
Catahoula-Winn	235,680	loblolly pine	179,839	30,121
Angelina-Sabine	229,813	loblolly pine	119,144	20,294
Francis Marion	205,219	loblolly pine	155,992	49,227
Vernon/Evang./ Kisatchie	167,505	loblolly pine	79,469	55,637
Homochitto	167,063	loblolly pine	146,726	0
Davy Crockett	140,744	loblolly pine	75,593	0
Bienville	136,871	loblolly pine	117,848	4,399
Sav. River FS	133,277	loblolly pine	62,969	37,183
Sam Houston	131,350	loblolly pine	115,610	0
Talladega	118,645	loblolly pine	50,350	39,722
Oakmulgee	100,387	longleaf pine	47,000	47,000
Osceola	89,156	longleaf pine	18,395	18,395
Daniel Boone	81,655	shortleaf pine	50,890	0
Cherokee	78,671	Virginia pine	39,045	0
Bankhead	76,670	loblolly pine	58,585	1,199
Oconee	76,528	loblolly pine	68,564	0
Ocala	69,576	longleaf pine	40,985	40,985
Conecuh	59,739	longleaf pine	40,099	40,099
Tombigbee	58,493	loblolly pine	43,454	0
Sumter	51,390	loblolly pine	51,390	0
Croatan	32,141	loblolly pine	21,808	10,333
Caney	19,946	loblolly pine	19,946	0
Tuskegee	6,218	loblolly pine	3,656	1,465
Totals	3,395,444			685,279

Table 13 shows the proportion of the compartments with RCW colonies and with RCW management taking place, for each RCW population. The proportion of compartments with greater than four active colonies is also identified. The populations are ranked in Table 13 by percent of the total compartments with RCW management. Thirty-seven percent of the total compartments reported are involved with RCW management. Eight populations (33 percent) have over 75 percent of the compartments in RCW management (Figure 6). Ten populations have compartments which contain more than four active colonies, and five of these populations have high RCW densities in more than 10 percent of the total compartments.

Table 13.--Compartment summary

		Percent of compartments with		
RCW population	*Total number of Compartments*	*RCW colonies*	*RCW targets*	*> 4 active RCW colonies*
Conecuh	69	77	100	0
Apalachicola	217	77	3	27
Tuskegee	20	5	90	0
Oakmulgee	119	65	86	13
Francis Marion	215	73	82	15
Croatan	61	54	82	0
Osceola	101	50	82	2
Vernon-Evang./Kis.	209	62	75	12
Bienville	179	36	56	11
Savannah River FS	90	12	56	0
Davy Crockett	121	49	49	0
Caney	30	10	47	0
Talladega	196	35	44	0
Catahoula-Winn	219	32	44	0
Angelina-Sabine	193	31	35	0
Homochitto	194	21	21	2
Sam Houston	125	62	18	4
DeSoto	470	9	14	0
Bankhead	160	2	14	0
Oconee	98	13	13	1
Ocala	272	6	12	<1
Sumter	78	4	5	0
Daniel Boone	407	5	4	0
Ouachita	441	3	4	0
Regional averages		29	37	

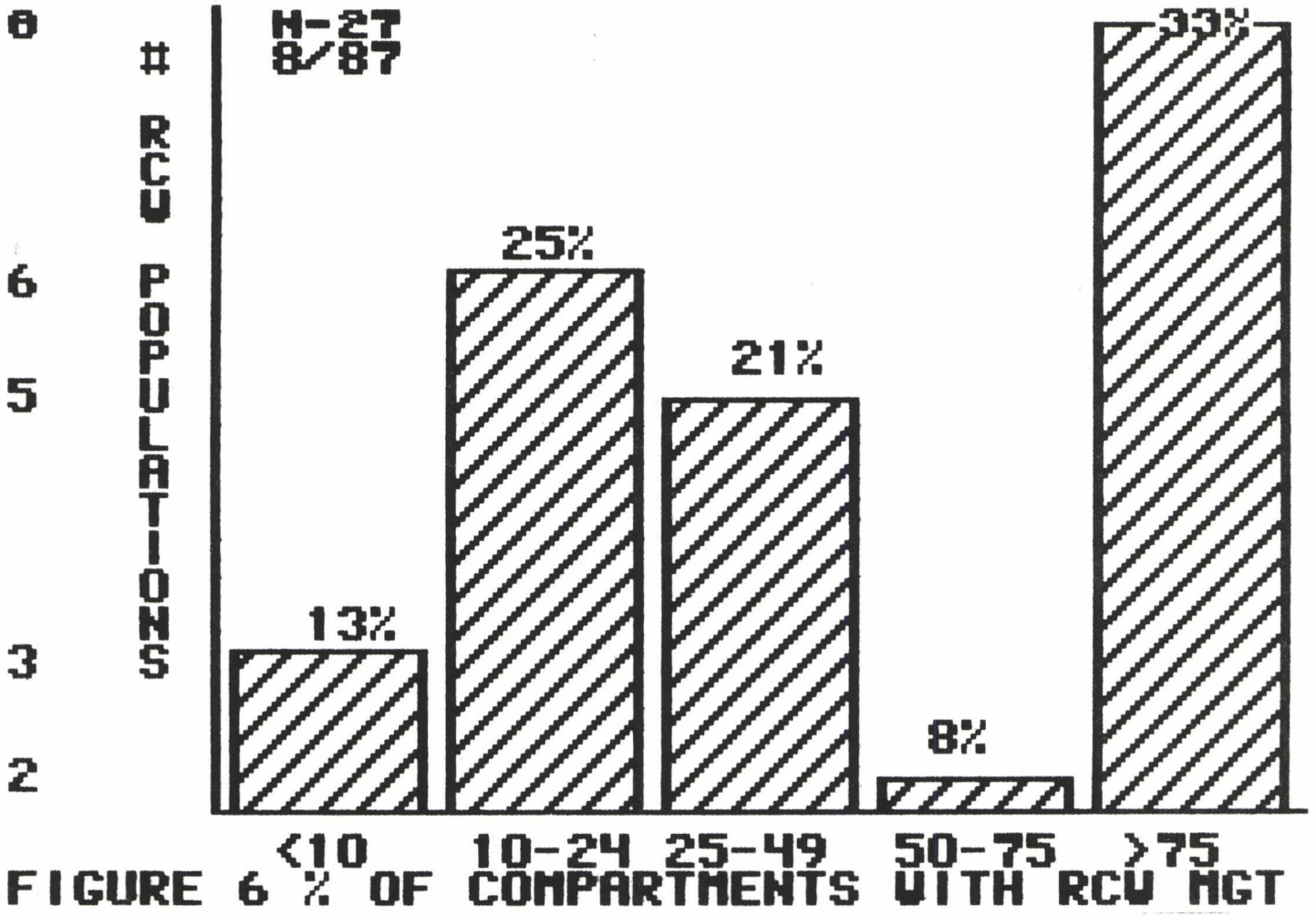


FIGURE 6

NOTE: Figure 6 is a 3 variable bar graph showing the number and percent of the RCW populations in relation to the percent of the compartments involved with RCW management. For example, 3 RCW populations, comprising 13 percent of all the RCW populations, have less than 10 percent of their compartments involved with RCW management.

Table 14 shows the suitable unoccupied acres identified by the units. The RCW populations are ranked in Table 14 by amount of unoccupied habitat. The units report that 231,459 acres of apparently suitable habitat in 15 RCW populations is not occupied by RCW's. Seventeen Districts (41 percent) do not know if unoccupied habitat exists on their unit. Although lack of complete colony searches prevents positive analysis, eight Forests feel that some RCW expansion into previously unoccupied habitat has occurred.

Table 14.--Unoccupied RCW habitat

RCW population	*Unoccupied acres*	*Pine/pine-hardwood acres*	*Percent unoccupied*
Homochitto	92,237	167,063	55
Ocala*	29,000	69,576	42
Vernon/Evang./Kis.*	24,300	167,505	15
Bienville*	15,000	136,871	11
Cherokee	14,988	78,671	19
Osceola	13,600	89,156	15
Apalachicola*	10,000	256,803	4
Angelina-Sabine*	9,946	229,813	44
Croatan	5,000	32,141	16
Sumter	5,000	51,390	10
Oconee*	5,000	76,528	7
Tuskegee	1,884	6,218	30
Savannah River FS	500	133,277	<1
Catahoula-Winn	0	253,680	0
Bankhead	unknown	76,670	-
Conecuh	unknown	59,739	-
Daniel Boone	unknown	81,655	-
Davy Crockett	unknown	140,744	-
DeSoto	unknown	363,605	-
Francis Marion*	unknown	205,219	-
Oakmulgee*	unknown	100,387	-
Ouachita	unknown	308,299	-
Sam Houston	unknown	131,350	-
Talladega	unknown	118,645	-

* RCW expansion into previously unoccupied habitat reported.

E. *Habitat Management*

The Districts were asked to identify the RCW colony acres being treated for midstory control, cost per acre, and the time period required before retreatment. This information was reported for current program, estimated requirements to bring all active colony sites in accordance with the midstory guides, and estimated requirements to bring all recruitment and replacement stands (R/R) in accordance with the midstory guides. Table 15 shows the reported costs per acre for burning, mechanical treatment, and chemical treatment by geographic province. The average RCW colony midstory burning cost is $12 per acre. The lowest burning cost is in the Lower Coastal Plain Forests ($7 per acre) and the highest is in the Cumberland Plateau ($29 per acre). Herbicide treatment averages $73 per acre, while mechanical treatment is the most expensive at $111 per acre.

The midstory treatments vary across the Region. The bulk of the burning treatments reported are non-growing season burns (winter burns). Growing season burning may average higher costs than reported here. Burning costs will also go up if colony sites have to be treated separately from general compartment scheduled burns. Chemical treatments reported include most hand herbicide applications: e.g. tree injection, thin-line, and pellets. Mechanical treatments reported include chainsaw, hydro-ax, and shearing.

*Table 15.--Current midstory treatment costs**

Geographic province	*Treatment type*		
	Burning	*Chemical*	*Mechanical*
Cumberland Plateau	29 (15-40)	0	144 (125-150)
Interior Highlands	20 (17-21)	75 (60-90)	75 (60-90)
Piedmont	10 (6-15)	55 (40-75)	80
Upper Coastal Plain	8 (3-15)	46 (31-60)	68 (50-80)
Lower Thin Loess	8	100	0
Lower Coastal Plain	7 (3-15)	57 (30-90)	143 (100-165)
Southern Region average:	12 (3-40)	63 (30-100)	111 (50-165)

*Costs are expressed as average dollars per acre for Districts reporting; the range of costs (dollars per acre) are shown in parentheses.

Table 16 shows the acres and costs of midstory treatments used in the various RCW populations. A total of almost 23,000 acres are being treated at a cost of $271,400 per year. Approximately 70 percent of the current annual treatment costs is for winter burning.

Table 16.--Current RCW colony midstory management costs and acres treated*

	Burning		*Mechanical*		*Chemical*		*Total*	
RCW population	*Acres*	*$**	*Acres*	*$**	*Acres*	*$**	*Acres*	*$**
Angelina/Sabine**	100	2	46	7.6	10	.9	156	10.5
Apalachicola	2,000	12	0	0	0		2,000	12
Bankhead	700	10.5	40	5	0	0	740	15.5
Bienville	640	4.3	0	0	150	9	790	13.3
Caney	0	0	0	0	0	0	0	0
Oconee	600	9	0	0	0	0	600	9
Conecuh	2,730	13.7	20	1.6	0	0	2,750	5.3
Croatan	100	1	0	0	0	0	100	1
Daniel Boone	500	15.5	9	1.4	0	0	509	16.9
Davy Crockett**	180	3.6	0	0	50	4	230	7.6
DeSoto	150	.7	0	0	46	1.5	196	2.2
Francis Marion	1,500	15	0	0	0	0	1,500	15
Homochito	146	1.1	0	0	167	13.9	313	15
Catahoula/Winn	1,000	15	0	0	0	0	1,000	15
Ocala	360	2.2	0	0	0	0	360	2.2
Osceola	1,000	6	0	0	0	0	1,000	6
Ouachita	1,413	26	150	10.5	100	7.5	1,663	44
Oakmulgee	5,000	15	25	1.9	0	0	5,025	16.9
Sam Houston**	200	4	25	3	75	6	300	13
Sumter	400	3.2	0	0	0	0	400	3.2
Talladega	2,000	12	6	.5	6	0.5	2,012	13
Tuskegee	0	0	0	0	0	0	0	0
Vernon/Evang./ Kisatchie	1,225	18.3	135	7	0	0	1,360	25.3
Southern Region**	21,944	190.1	456	38.5	598	42.8	22,998	271.4

*Costs expressed in thousands of dollars.
**Regional total has been adjusted to include missing Forest data using average acre accomplishments for Forests in question.

Table 17 shows the total acres and costs of midstory treatment required in all of the active colony sites, by RCW population. A total of 23,000 acres need to be treated at a cost of $655,000 per treatment period. Approximately 70 percent of the active colony site treatment costs is for mechanical or chemical treatment.

Table 17.--*Active RCW colony midstory management - costs* and acre treatment requirements*

RCW population	*Burning*		*Mechanical*		*Chemical*		*Total*	
	Acres	*$**	*Acres*	*$**	*Acres*	*$**	*Acres*	*$**
Angelina-Sabine	510	21.6	205	24.6	26	2	741	48.2
Apalachicola	1,986	11.9	0	0	0	0	1,986	11.9
Bankhead	10	.2	10	1.3	0	0	20	1.5
Bienville	600	4.2	30	2.4	180	10.8	810	17.4
Caney	0	0	0	0	0	0	0	0
Cherokee	0	0	25	3.8	0	0	25	3.8
Conecuh	320	1.6	200	20	0	0	520	21.6
Croatan	300	3	100	10	0	0	400	13
Daniel Boone	70	2.5	70	10.5	0	0	140	13
Davy Crockett	370	7.4	199	8.9	199	15.7	768	32
DeSoto	268	1.3	0	0	264	9	532	10.3
Francis Marion	5,095	51	0	0	0	0	5,095	51
Homochitto	394	1.1	10	1	377	34.8	781	36.9
Catahoula-Winn	820	12.3	0	0	820	53.3	1,640	65.6
Ocala	200	1.2	20	.6	0	0	220	1.8
Oconee	220	3.3	160	8.8	25	1.9	405	14
Osceola	550	2.5	0	0	0	0	550	2.5
Ouachita	229	4.1	210	14.1	69	5.6	508	23.8
Oakmulgee	2,000	10	280	21	0	0	2,280	31
Sam Houston	1,120	22.4	635	76.2	485	38.8	2,240	137.4
Savan.River FS**	0	0	0	0	30	1.6	30	1.6
Sumter	0	0	0	0	0	0	0	0
Talladega	110	6.8	16	1.5	6	.2	132	8.5
Tuskegee	0	0	0	0	0	0	0	0
Vernon/Evang./ Kisatchie	2,000	28.5	700	36.0	500	32.5	3,200	97
Southern Region	17,172	193.4	2,867	255.2	2,978	206.3	23,017	655

*Costs expressed in thousands of dollars.
**Not included in Southern Region total.

Table 18 shows the total acres and costs of midstory treatment required in all of the R/R stands, by RCW population. A total of almost 59,000 acres need to be treated, at a cost of $1,374,700 per treatment period. Approximately 70% of the R/R stand treatment costs is for mechanical or chemical treatment.

Table 18.--RCW R/R stand midstory management-Costs and one treatment requirements*

	Burning		*Mechanical*		*Chemical*		*Total*	
RCW population	*Acres*	*$**	*Acres*	*$**	*Acres*	*$**	*Acres*	*$**
Angelina-Sabine	935	11.4	1,005	120.6	160	12.8	2,100	144.8
Apalachicola	8,260	49.6	0	0	0	0	8,260	49.6
Bankhead	500	10	50	6.3	0	0	550	16.3
Bienville	2,500	17.5	0	0	290	17.4	2,790	34.9
Caney	200	2.4	0	0	200	12.6	400	15
Cherokee	0	0	0	0	10	1.3	10	1.3
Conecuh	1,250	6.3	0	0	0	0	1,250	6.3
Croatan***	5,000	50	0	0	0	0	5,000	50
Daniel Boone***	500	18	500	75	0	0	1,000	93
Davy Crockett	1,250	15	625	0	0	1.875	90	
			75					
DeSoto	2,530	13.7	0	0	2,530	86.2	5,060	99.9
Francis Marion	5,000	50	0	0	0	0	5,000	50
Homochitto	1,000	10	0	0	1,000	100	2,000	110
Catahoula-Winn	1,230	14.8	0	0	1,250	81.3	2,480	96
Ocala	1,370	8.2	50	1.5	0	0	1,420	9.7
Oconee***	1,650	24.8	0	0	0	0	1,650	24.8
Osceola	2,500	11.3	0	0	0	0	2,500	11.3
Ouachita	434	7.8	370	23.7	114	8.3	918	39.8
Oakmulgee	2,500	12.5	200	15	0	0	2,700	27.5
Sam Houston	2,500	50	1,550	186	1,000	80	5,050	316
Savan. River FS**	650	5.2	258	12.4	305	16.8	1,213	34.4
Sumter	100	1	0	0	0	0	100	1
Talladega	1,900	12.7	100	10	0	0	2,000	22.7
Tuskegee	210	1.7	0	0	210	13.2	410	14.9
Vernon/Evang./ Kisatchie	3,275	34.3	1,020	52	775	50.4	5,070	136.7
Southern Region	*47,244*	*417.9*	*5,728*	*577.4*	*7,844*	*480.2*	*60,816*	*1475.5*

*Costs expressed in thousands of dollars.
**Not included in Southern Region total.
***R/R stands not applicable; treatment is a proportion of RCW compartments managed as currently suitable for nesting.

The proportion of the RCW habitat management program financed under KV projects is summarized on Table 19. We estimate that about double the current RCW work can be funded under KV.

Table 19.--KV funded RCW habitat management

	Current program percent	*Potential Program Percent*
Midstory control	24	45
Colony mapping, etc.	35	35
Monitoring	15	27

F. *Handbook Implementation*

Forty-five districts responded to this series of questions; however, not all questions applied to all Districts. Table 20 summarizes the District accomplishments.

Table 20.--District summary of handbook guideline accomplishments

Handbook criteria	*Percent accomplished*					
	0	1-25	26-50	51-75	76-99	100
#colonies mapped/marked	7	5	5	2	36	45
#active with R/R assigned	23	27	25	0	7	18
#comp. with R/R in CISC	21	36	24	2	5	12
#comp. with foraging assigned	17	31	12	2	5	33
#active within midstory guides	7	16	28	9	14	26
#R/R within midstory guides	18	28	10	13	8	23
#active within overstory BA	9	7	17	17	33	17
#R/R within overstory BA	15	13	15	22	10	25
#colonies treated in 1986	15	47	29	7	2	0
R/R treated in 1986	49	33	15	0	3	0
	Percent identified					
	0	*1-25*	*26-50*	*51-75*	*76-99*	*100*
#colonies isolated	68	28	2	0	2	0
#colonies <125 acres foraging	51	40	0	2	7	0
#colonies <50 acres >60 yrs.	46	26	7	7	14	0

Figures shown are percent of Districts within respective percent category.
Eighty-one percent of reporting Districts have mapped and marked at least 75 percent of their cavity trees, and 45 percent of those Districts have completed 100 percent of that work.

Generally, Districts indicated that CISC data bases were not up-to-date. Thirty (75 percent) Districts have less than 50 percent of their active colonies and replacement stands in CISC; 20 (50 percent) Districts have less than 25 percent identified.

Thirty-four (81 percent) Districts have recorded less than 50 percent of their RCW compartments' R/R stands in the CISC data base, while 24 (54 percent) have less than 25 percent of these stands identified. Although 16 (28 percent) Districts have identified foraging habitat by stands in at least 76 percent of their compartments, 48 percent have identified foraging habitat in less than 25 percent of their compartments.

Hardwood midstory encroachment varies significantly within the Region. While 51 percent of the Districts reported less than 50 percent of their active colonies satisfied hardwood midstory guidelines, 40 percent indicated hardwood midstory conditions were satisfactory in 76 percent of their active colonies. Districts indicated hardwood midstory conditions in recruitment stands to be very similar to conditions in active colonies.

Twenty-one (50 percent) Districts reported at least 75 percent of their active colonies meet the overstory conifer basal-area guidelines. However, 33 percent
of the Districts indicated less than 50 percent of their active colonies satisfy overstory guidelines. Overstory basal-area conditions in recruitment stands are less satisfactory than in active colonies. Only 35 percent of the Districts reported that at least 76 percent of their recruitment stands meet overstory guidelines, while 43 percent reported less than 50 percent of the recruitment stands satisfy overstory guidelines.

Isolation of colonies from suitable foraging habitat was not documented as a problem. Almost 70 percent of the Districts reported no isolation, with the majority (28 percent) of the remaining Districts indicating that less than 25 percent of their active colonies are isolated from foraging habitat. Availability of quality foraging habitat was not identified as a major problem by the Districts. Approximately 50 percent of the Districts reported 100 percent of their colonies comply with the acre/age foraging criteria specified in the Forest Service Handbook.

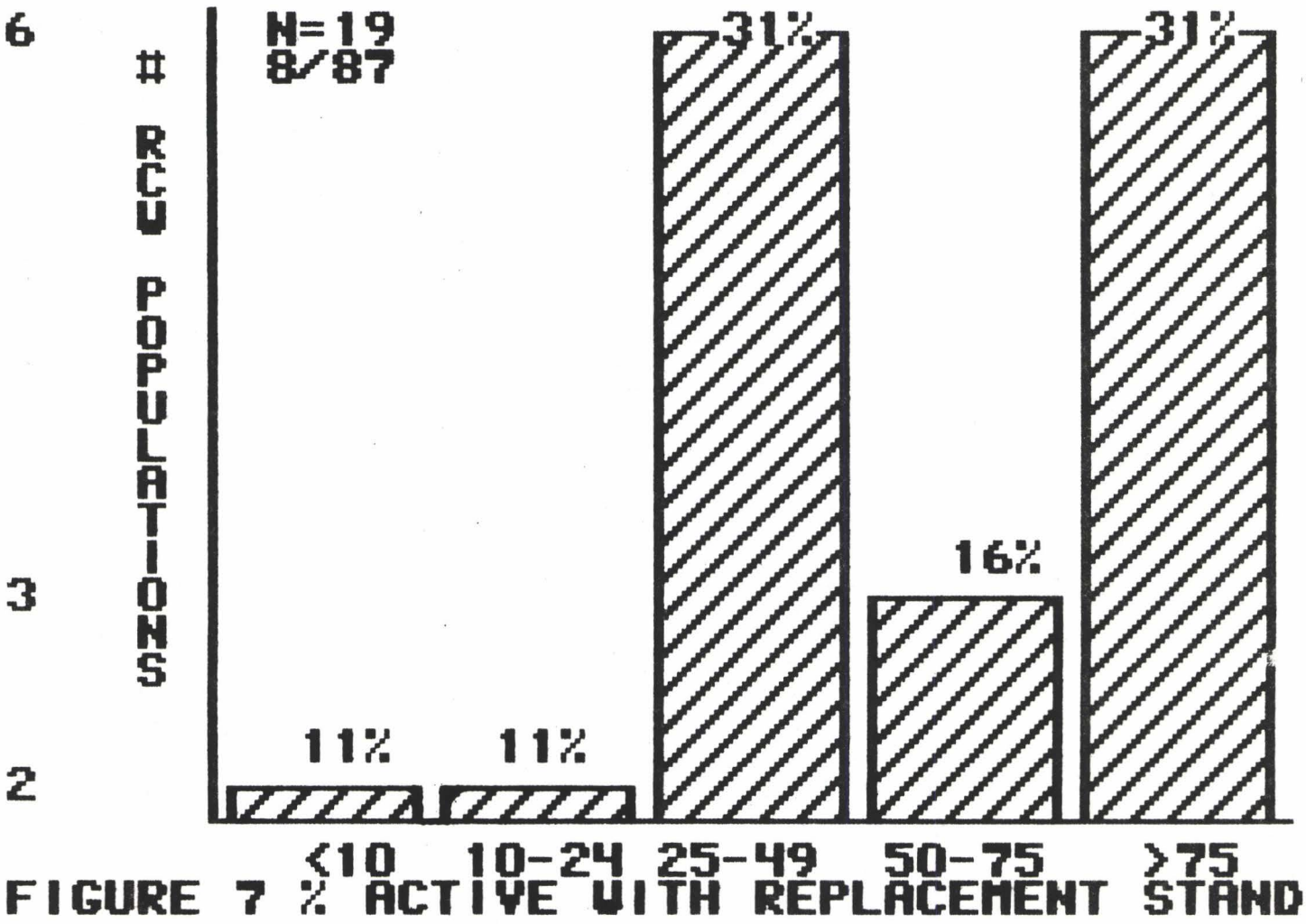
Thirty-eight Districts accomplished RCW habitat improvement work at 613 colonies in 1986. Colonies treated per District averaged 16, and ranged from 1 to 147. Seven Districts reported no RCW colony habitat improvement in 1986. Approximately 50 percent of the Districts reported no habitat improvement work in recruitment stands, and 33 percent accomplished habitat work in less than 25 percent of their recruitment stands.

The current colony mapping and stand identification status is summarized by RCW population in Table 21. This table shows the percent of (1) the total RCW colony sites with cavity tree delineation and mapping, (2) the active colonies with R/R stands delineated, (3) the compartments with RCW habitat with R/R stands delineated, and (4) the compartments with RCW habitat with foraging habitat delineated. Six populations (31 percent) have replacement stands delineated for more than 75 percent of their active colonies (Figure 7). Nine populations (41 percent) have more than 50 percent of their recruitment stands delineated
Figure 8).

Table 21.--RCW colony mapping and stand identification

RCW population	*Total colonies mapped*	*Active colonies with R/R*	*RCW compartments with R/R*	*RCW compartments w/foraging*
		*Percent**		
Angelina-Sabine	95	60	60	40
Apalachicola	100	55	50	-
Bankhead	75	100	90	100
Bienville	90	50	50	50
Caney	0	NA	0	100
Cherokee	0	0	0	0
Conecuh	100	85	0	0
Croatan	100	NA	NA	0
Daniel Boone	85	NA	NA	100
Davy Crockett	75	80	25	20
DeSoto	95	20	20	20
Francis Marion	95	25	25	100
Homochitto	90	30	25	25
Catahoula-Winn	45	25	10	100
Ocala	95	40	45	0
Oconee	50	NA	NA	10
Osceola	100	40	40	0
Ouachita	100	100	95	80
Oakmulgee	100	25	30	30
Sam Houston	90	<5	<5	<5
Sumter	30	NA	100	100
Sav. River FS	100	100	60	60
Talladega	95	100	50	100
Tuskegee	100	NA	100	100
Vernon/Evang./ Kisatchie	65	10	15	40

*Percent has been rounded to nearest 5 percent



NOTE: Figure 7 is a 3 variable bar graph showing the number and percent of the RCW populations in relating to the percent of active colonies with established replacement stands. For example, 2 populations, comprising 11 percent of the populations responding, have less than 10 percent of their active colonies with established replacement stands.

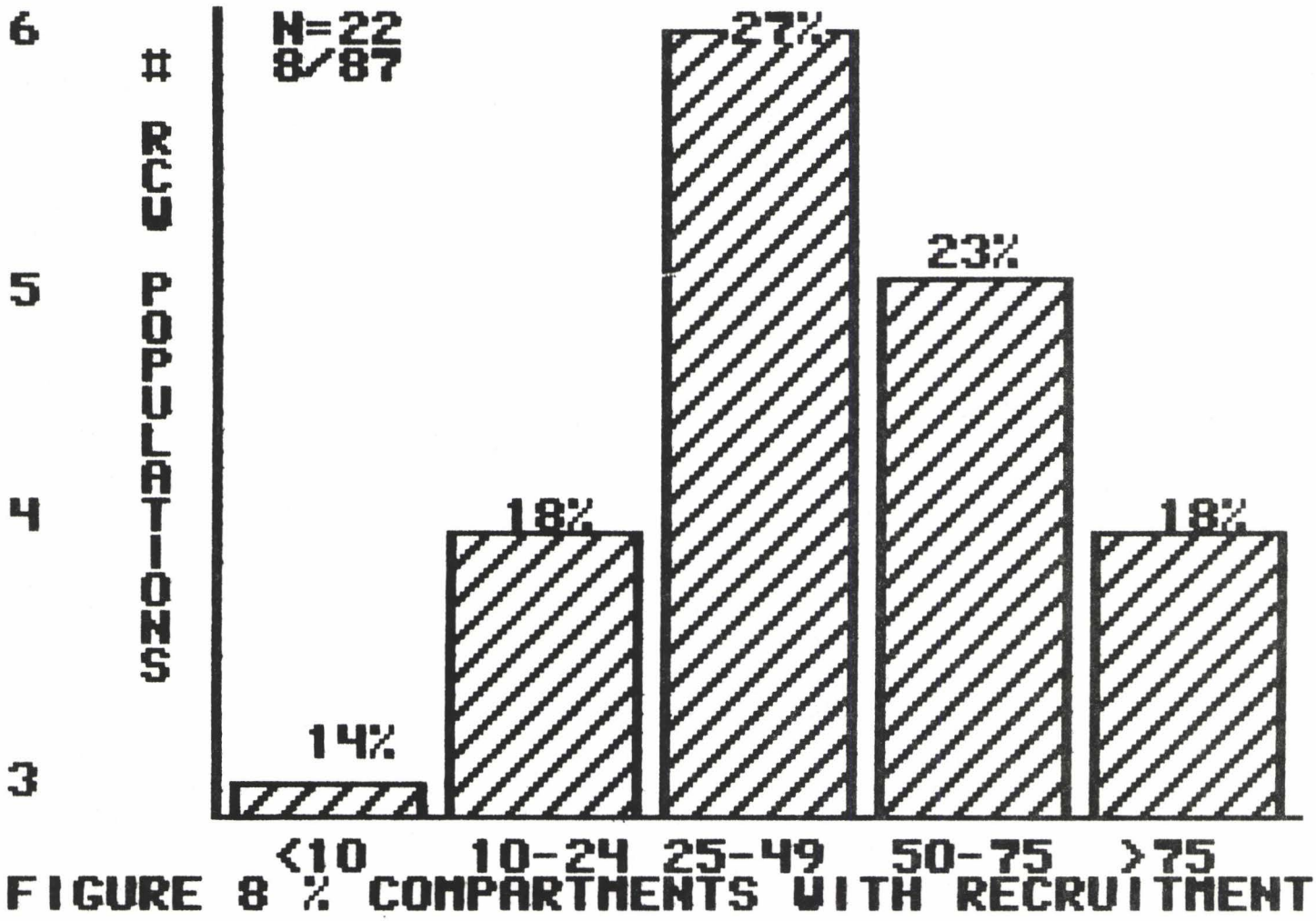


FIGURE 8 % COMPARTMENTS WITH RECRUITMENT

NOTE: Figure 8 is a 3 variable bar graph showing the number and percent of the RCW populations in relation to the percent of RCW compartments with established recruitment stands. For example, 3 RCW populations, comprising 14 percent of the RCW populations responding, have less than 10 percent of the RCW compartments with established recruitment stands.

Colony site habitat-management guideline status is summarized by RCW population in Table 22. This table summarizes the percent of (1) the active colony sites with less than 20 square feet per acre midstory hardwoods, (2) the R/R stands with less than 20 square feet per acre midstory hardwoods, (3) the active colony sites with the proper pine overstory spacing, and (4) the R/R stands with the proper pine overstory spacing. Five populations (23 percent) have all of their active colonies within the midstory guidelines, while 3 populations (14 percent) have less than 25 percent of this work accomplished (Figure 9). Eighteen populations (82 percent) have more than 50 percent of their active colonies within the overstory pine BA guides (Figure 10).

Table 22.--RCW colony site habitat guideline status

RCW population	*Active colonies midstory OK*	*R/R midstory OK*	*Active colonies pine BA OK*	*R/R pine BA OK*
		*Percent**		
Angelina-Sabine	50	10	50	25
Apalachicola	100	100	85	100
Bankhead	100	25	100	70
Bienville	20	25	20	50
Caney	NA	50	NA	100
Cherokee	0	0	0	0
Conecuh	70	30	70	60
Croatan	60	NA	80	NA
Daniel Boone	50	NA	60	NA
Davy Crockett	50	<5	10	0
DeSoto	50	70	75	70
Francis Marion	90	100	90	100
Homochitto	30	10	60	60
Catahoula-Winn	60	60	70	70
Ocala	100	100	90	100
Oconee	60	NA	75	NA
Osceola	100	100	80	80
Ouachita	75	75	50	25
Oakmulgee	90	90	90	60
Sam Houston	10	0	5	<5
Sumter	NA	100	NA	0
Savannah River FS	100	10	100	50
Talladega	95	80	90	80
Tuskegee	NA	75	NA	100
Vernon/Evang/ Kisatchie	70	60	80	70

*Percent has been rounded to nearest 5 percent.

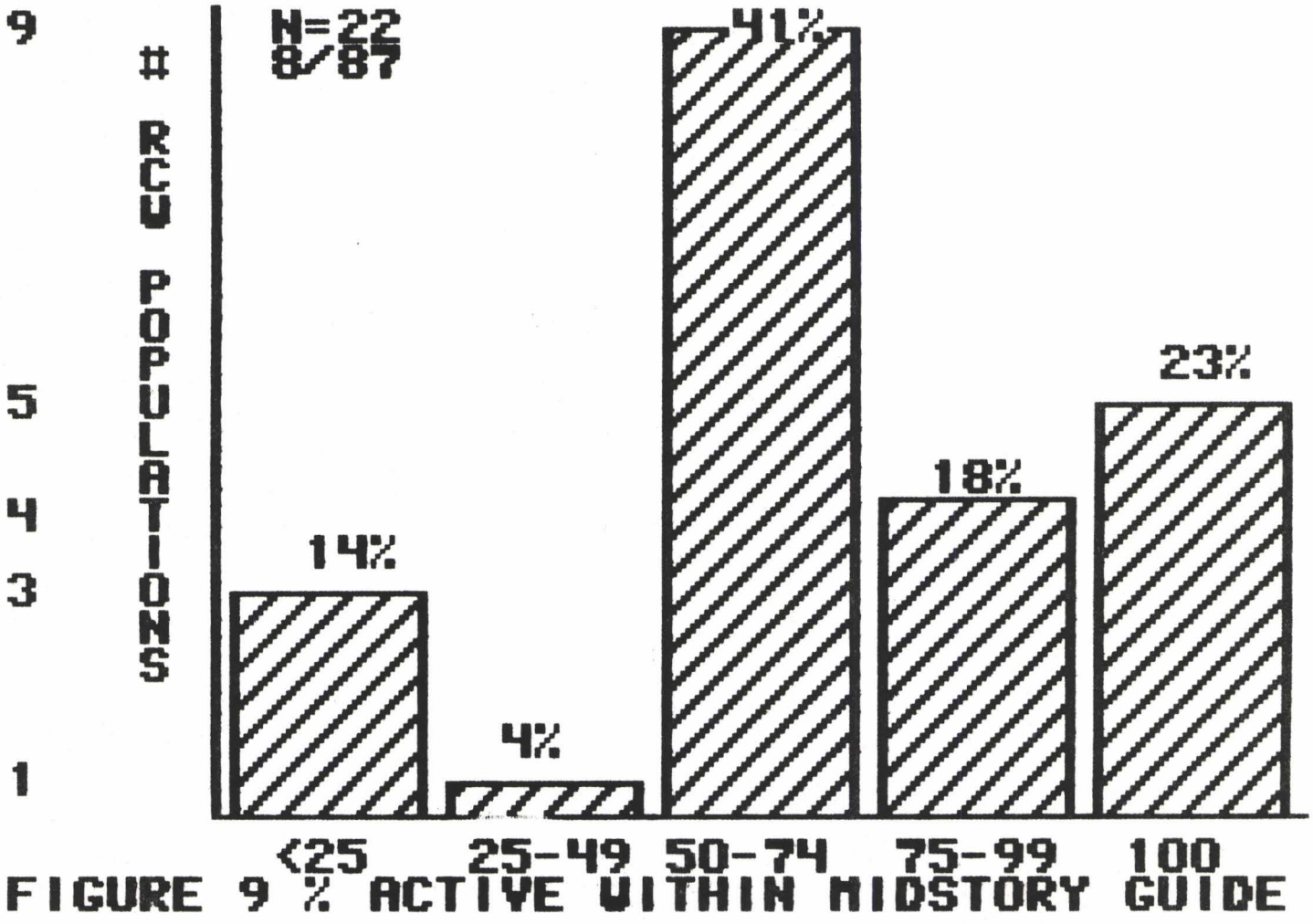


FIGURE 9 % ACTIVE WITHIN MIDSTORY GUIDE

NOTE: Figure 9 is a 3 variable bar graph showing the number and percent of the RCW populations in relation to the percent of the active colony sites within the midstory hardwood basal area guidelines (less than 20 square feet per acre, FSH 2609.23R). For example, 3 RCW populations, comprising 14 percent of the populations responding, have less than 25 percent of their active colony sites with less than 20 square feet of midstory hardwoods per acre.

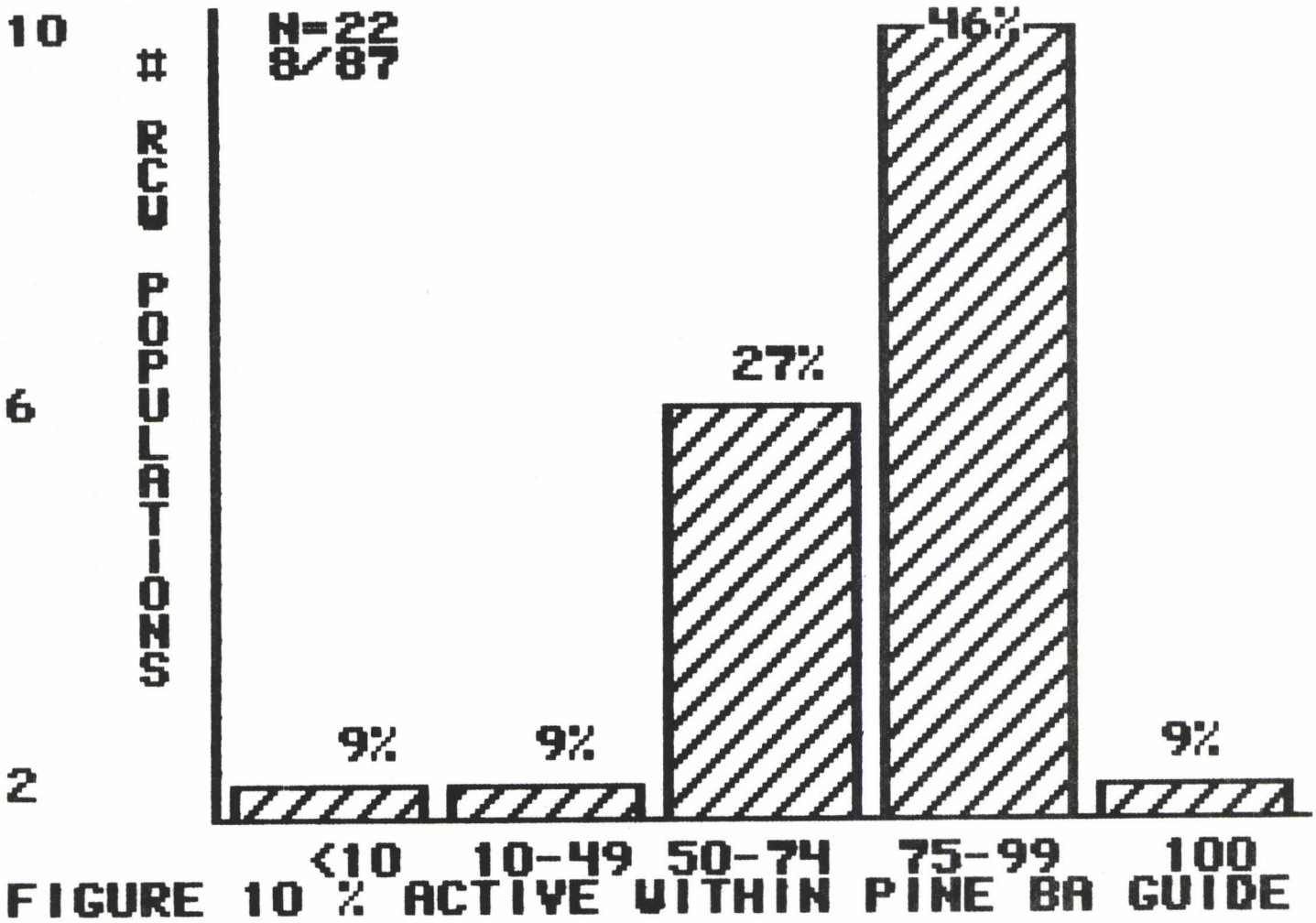


FIGURE 10

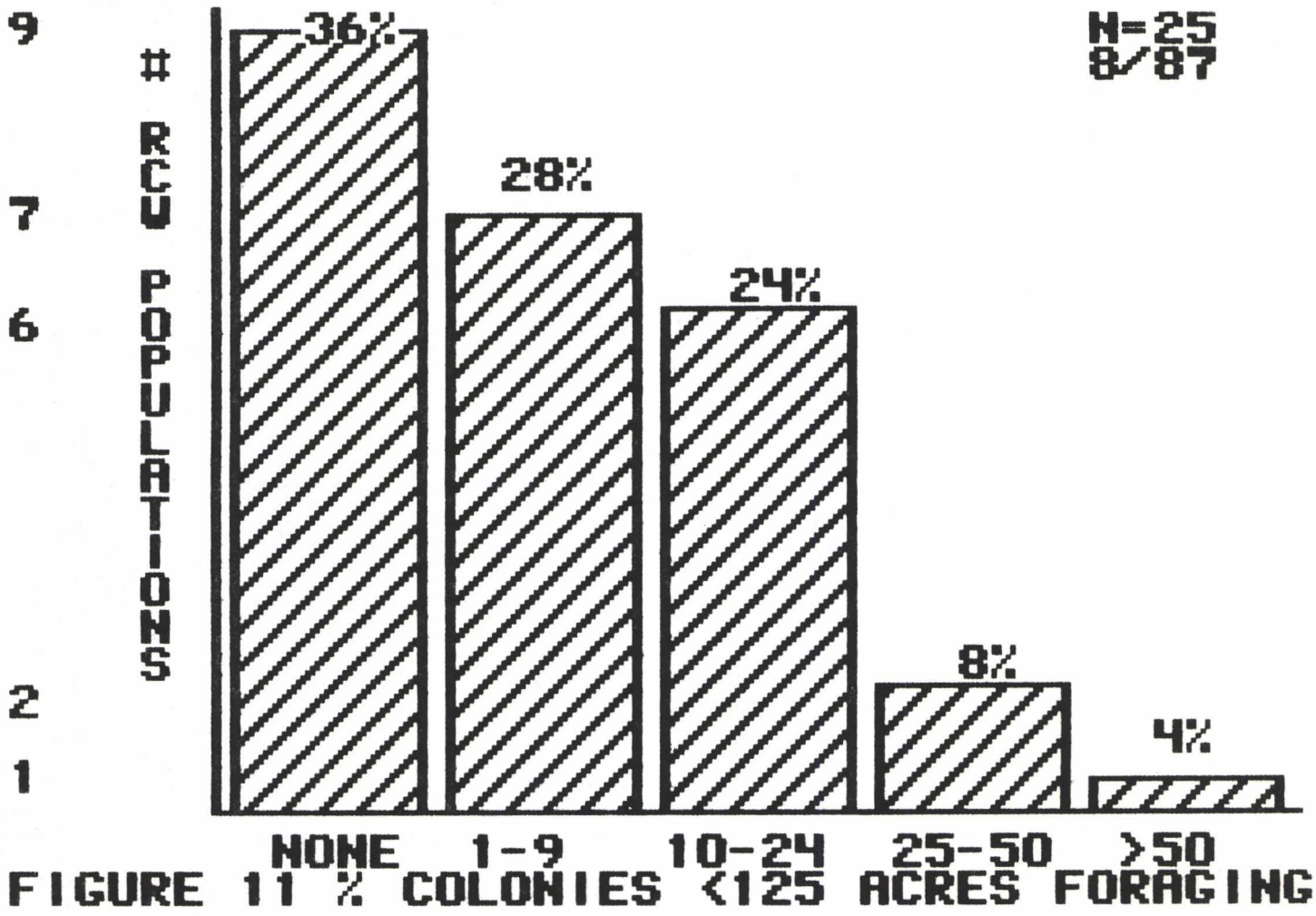
NOTE: Figure 10 is a 3 variable bar graph showing the number and percent of the RCW populations in relation to the percent of the RCW populations in relation to the percent of the active colony sites within the overstory pine basal area guidelines (50-80 square feet per acre, FSH 2609.23R). For example, 2 RCW populations, comprising 9 percent of the populations responding, have less than 10 percent of their active colony sites with an overstory pine basal area of 50-80 square feet per acre.

Colony foraging habitat configuration is summarized by RCW population in Table 23. This table summarizes the percent of (1) the total colony sites isolated (not contiguous with) from its foraging habitat, (2) total colonies with less than 125 acres of foraging habitat within 1/2 mile of the colony site, and (3) total colonies with less than 50 acres of greater than 60 years of age pine or pine-hardwood stands within 1/2 mile of the colony site. Sixteen populations (64 percent) have less than 10 percent of their colonies with less than 125 acres foraging habitat (Figure 11).

Table 23.--RCW colony foraging habitat guideline status

RCW population	Colony site *isolated*	Colonies *<125 acres*	Colonies *<50 acres >60*
		*Percent**	
Angelina-Sabine	5	5	5
Apalachicola	0	10	20
Bankhead	0	0	35
Bienville	5	5	<5
Caney	0	0	0
Cherokee	0	0	0
Conecuh	0	15	0
Croatan	10	0	0
Daniel Boone	0	15	0
Davy Crockett	0	5	0
DeSoto	0	<5	86
Francis Marion	5	5	40
Homochitto	0	0	10
Catahoula-Winn	25	10	20
Ocala	0	0	0
Oconee	0	0	0
Osceola	0	5	75
Ouachita	25	5	5
Oakmulgee	5	25	30
Sam Houston	5	10	17
Sumter	0	0	0
Savannah River FS	0	100	90
Talladega	0	5	5
Tuskegee	0	0	0
Vernon/Evang./ Kisatchie	<5	15	75

*Percent has been rounded to nearest 5 percent.



NOTE: Figure 11 is a 3 variable bar graph showing the number and percent of the RCW populations in relation to the percent of RCW colonies not within the foraging habitat guides (125 acres of well stocked pine and pine-hardwood within 1/2 mile of the colony site). For example, 9 RCW populations, comprising 36 percent of the populations responding, have none of their colonies with less than 125 acres for foraging habitat.

G. *Miscellaneous Questions*

Districts generally support development of a standardized computer data base.
Thirty-three (73 percent) of the 45 Districts responding indicated a need for a data base. Districts want a data base capable of storing, compiling, summarizing, and maintaining RCW data. The data base could be used to:

1) plan annual habitat improvement work

2) provide a historical record to assess population trends and monitor programs

3) generate data tables and summaries for reports

4) facilitate the prescription process and other resource planning activities

Responses to the question concerning RCW handbook chapter interpretation and/or revisions were mixed. Twenty-five (54 percent) Districts have no problems with the handbook; however, 21 (46 percent) Districts indicated problems covering a wide range of issues. "Handbook too complicated", particularly in reference to R/R stand guidelines, was a frequent response. Several Districts suggested standardized regionwide data collection and colony monumentation systems. Other suggestions included:

- direction for timber management options in areas of high RCW densities

- refining colony estimate system by implementing latest research findings by Harlow, et. al. (1983).

- revising guidelines to reflect decisions approved in the Southern Pine Beetle Suppression Environmental Impact Statement

Forty-six Districts answered the inquiry concerning use of volunteers or other publics for RCW monitoring work. Eleven (24 percent) Districts have volunteer help. Although 35 (76 percent) Districts are not using volunteers, 4 are planning volunteer programs for the future and 6 have contracts or challenge grants for monitoring programs in 1987.

Twenty-four (50 percent) Districts indicated on-going or past RCW research on their Districts. Investigations include a variety of topics including status surveys, RCW/SPB relationships, home range determinations, nesting habitat analysis, foraging ecology, and reproductive success.

Although a majority (64 percent) of the 44 Districts responding had no suggestions for new or different management strategies, several management issues were identified several times, as important to District's RCW programs. Timber management strategies for Districts with high RCW populations are needed. Management guidelines for seedtree and shelterwood stands, colonized by RCW, are also necessary. Several Districts have an interest in reintroduction and population augmentation programs. In addition to the major issues highlighted above, suggestions were received concerning prescribed-burning strategies in wilderness areas and the need for control of RCW predators and cavity competitors.

Twenty-five Districts made additional comments on their RCW program. Ten of the Districts simply elaborated on answers to questions within the Data Sheet or discussed items of particular interest to their District or RCW population. The remaining 15 Districts commented on management problems associated with a lack of adequate funding. Problems include insufficient staffing to accomplish population monitoring responsibilities, backlogs of habitat improvement and maintenance accomplishments, and inconsistencies in funding levels over time.

IV. *DISCUSSION*

A. *Population Status, Distribution, and Trend*

The number of reported active colonies in 1986 (2115) is virtually the same as estimated in the 1980 baseline survey (2121), but the number of known colonies has increased by almost a third since Hamel's work in 1980. The proportion of total colonies believed to be active has decreased over this time period. It appears that although a large number of active colonies have been found, through increased survey efforts since 1980, most of these are not "new" colonies but just previously unknown colonies that have been historically active. It also appears that the number of active colonies has actually declined since 1980.

Although 21 southern national forests contain active RCW colonies, the population is unevenly distributed. Four Forests (Apalachicola, Francis Marion, Kisatchie and Talladega) in four States (Florida, South Carolina, Louisiana, and Alabama) harbor 75 to 80 percent of the FS' RCW population. A similar distribution was noted in the 1980 rangewide surveys. This distribution pattern places increased responsibility for management and maintenance of the existing active colonies on those Forests. Program budgets, habitat improvement targets, staffing and timber volume goals should reflect the needs of these Forests' RCW populations and the significant role they must play in RCW conservation.

Rangewide, population fragmentation remains a serious concern. Almost 80 percent of the FS populations are over 50 miles apart. Additionally, habitat between the populations is generally not contiguous forested acreage. Populations known to have RCW's in the 1970's are now gone. They existed on the Caney Ranger District and the Sumter, Tombigbee, Tuskegee, and Uwharrie National Forests. Population fragmentation may have contributed to their declines and eventual disappearance. In addition, the previous populations were small (less than 25 known colonies) and most colonies exhibit significant hardwood encroachment.

Small, isolated populations with declining population trends are prime candidates for extinction and hence must be the focus for renewed conservation efforts. The majority of FS populations fit this category. Sixty-six percent of FS populations have less than 50 active colonies. About 67 percent of the populations show signs of decline. The extinction scenario of fragmentation, increased intra-population isolation, small population size and decreasing population trend common to many of our endangered species in North America is occurring with the RCW as well.

B. *Monitoring*

Colony survey intensity and quality have increased tremendously since 1980. Ninety percent of the districts completed colony surveys in 1985 or 1986. In 1986, 28 percent of all the known colonies were

surveyed. Sixty percent of the districts complete a 100-percent sample of known RCW colony sites in their routine colony surveys. Although good coverage of the colonies is routine, the type of information gathered varies. Unfortunately, very little data is computerized for future retrieval or analysis. The Francis Marion NF is in the process of replicating the 1980 rangewide survey. Their survey technique and analysis will form the basic methodology for additional forest surveys scheduled for completion in the early 1990's. These surveys will provide a statistical estimate of population trends over the last 10 years in our larger populations.

In the absence of statistically sound trend information, statements about RCW population trends on National Forests must rely on routine colony status checks and subjective inferences about changes in population size or health. It is important to know the inherent bias associated with this type of information. Generally our survey methodology will tend to overestimate population declines. Because of this, the status and trends described in this publication are probably the worst that could be occurring. The following summarize the inherent bias in the FS colony surveys: (1) Pre-1980 colony survey information often overestimated the number of RCW colonies. This error usually resulted from incorrectly identifying sapsucker or pileated woodpecker feeding signs as those of RCW, or recording several colonies when single cavity trees were found away from colony site centers. Increased training, experience, and colony designation guides have reduced this type of error in more recent surveys. Caution is advised when comparing old and new survey results. (2) Colony status checks tend to over estimate the number of inactive colonies. Generally, surveyors revisit only known colony sites rather than conduct systematic area surveys. The accuracy of an inactive determination depends upon a thorough search to identify shifts in the colony site. If only colony sites are surveyed, recorded population declines are guaranteed if colony sites move. It is very difficult to quantify this type of error.

In this report the proportion of colonies checked and found to be active in a given year is used as an index for population trend analysis. This will minimize the first source of error described above, but not the second. This index assumes that the colonies surveyed are based on a random sample of colonies. There may be a tendency for surveyors to sample active rather than inactive colonies. This practice will overestimate the proportion of active to inactive colonies in the sample. We have disregarded the smaller sample sizes to reduce this error.

A limitation of colony surveys is that they are usually based on ocular estimates of pitch-well activity, cavity sign, etc. They are an index of colony-site occupancy, not breeding activity. In small, declining populations this index is not sensitive enough to identify single-bird clans, or declining clan viability. Thus, records will show a colony active until it is abandoned.

C. *Habitat*

Analysis of the habitat data reveals several factors that have probably contributed to the current status and trends of RCW populations. Generally, RCW population expansion is presently limited by the existing forest age class distribution. Although stand age is increasing in most forests with RCW's, increases in suitable nesting habitat will not become available for at least 10 years. Although the potential for additional suitable cavity trees is increasing, the time lag for this increase varies significantly by population. Approximately 45 percent of the populations will have increased potential

nesting habitat in the next 20 years. The remainder of the populations will have additional suitable nesting habitat within 20 to 40 years. In forests where suitable cavity trees are limiting and management practices optimal, the best we can expect for RCW populations during the habitat bottleneck period is stability.

In some populations, nesting habitat potential is decreasing due to the loss of old-growth relic trees from natural mortality and timber management practices. If availability of suitable cavity trees from stand age increases is inadequate to offset this loss, population decreases are possible.

Hardwood midstory encroachment has caused rapid population declines in some RCW populations. Hardwood midstories in colony stands increase interspecific competition for RCW cavities and create a favorable environment for nest predation. Conversely, in forests with a long history of burning and no midstory problems, healthy RCW populations are present. On forests with no midstory problems, but with slow population declines, losses can probably be attributed to natural mortality of cavity trees and the habitat bottleneck previously discussed. In forests with midstory problems, but where suitable cavity trees are not limiting, midstory management should favor population increases even during the bottleneck period.

RCW population health is further compromised in small populations because of genetic and demographic factors. A threshold undoubtedly exists (minimum viable population) where even with acceptable habitat conditions populations may be lost.

D. *Habitat Management*

District responses to the habitat management questions illustrated several key points concerning the hardwood midstory control program: (1) although the acres currently treated are adequate to maintain the suitability of all the active colonies in the Region, the type (primarily winter burning) or frequency of treatment has been ineffective in controlling hardwood encroachment; (2) a tremendous backlog of colonies needing intensive treatments has accumulated to the point that now, about 20,000 acres need intensive treatment at a cost of about $1.5 million; and (3) the midstory control program cannot be a short-term "fix it" project, but must be a long-term habitat management program; at least 17,500 acres must be burned per year to maintain suitable nesting habitat needed to achieve recovery objectives, at an annual cost of about $263,000. Mid-story control involves significant cost, various combinations of treatment possibilities (mechanical, chemical and burning), setting treatment priorities and establishing treatment schedules. A well planned and executed midstory control program must include the previously mentioned considerations. An example of a comprehensive midstory management strategy that would bring all colonies and R/R stands into handbook compliance within 10 years is outlined below.

Annual midstory treatment costs necessary to control and maintain hardwoods in colonies and RR/Stands are shown in Table 24. These costs are based on the following implementation schedule: (1) all of the intensive treatments for active colonies are programed for the first year; (2) intensive treatments for inactive colonies and R/R stands are averaged over a 10-year period; (3) intensive treatment areas are burned the following year, then burned on a 3-year recurring burning schedule; (4) areas currently suitable are maintained with the normal district burning program. These costs are

segregated by intensive treatments and maintenance burning, and by active colony treatment versus inactive colonies and R/R stand treatments. The total cost for the first decade is $1,620,600 for active colony treatments and $2,588,200 for R/R treatments. This equals a $420,830 average annual total cost for mid-story treatments for the first decade. The total cost for the second decade is $1,115,000 for active colony treatments, and $2,282,800 for R/R treatments. This equals a $339,780 average annual total cost for midstory treatments for the second decade. These costs do not include foraging habitat taintenance.

At the end of the second year all active colony sites would be within the midstory guidelines. All inactive colony sites and R/R stands would be within the guidelines by year 11; those requiring only burning would be complete in year two. Treatment priorities would assure that those sites with the greatest probability of attracting a dispersing woodpecker would be treated first:

PRIORITY 1: Active colony sites requiring a burn to maintain control of midstory. This is a "protect the investment" strategy. Hardwoods must be less than 2 inches in diameter at ground level for nongrowing season burns to be effective. Regional cost average for this type of treatment is $15 per acre. A total of 17,172 acres are identified as needing this type of treatment at a total cost of $193,400. This equates to 5,503 acres treated per year at a cost of $65,700 per year to maintain the presently suitable acres based on district retreatment and cost figures. As colony sites requiring intensive treatments are completed, these acres will shift into a maintenance burning schedule. To maintain midstory control on all active colonies would require treatment of about 7,000 acres per year, at a cost of $105,000 per year.

PRIORITY 2: Active colony sites requiring intensive midstory control techniques (growing season burn, mechanical, or chemical) to achieve midstory objectives. The Regional average cost for this type of treatment is $100 per acre. A total of 5,845 acres are identified as needing this type of treatment at a total cost of $461,500. The number of acres treated per year would be dictated by budget constraints, but the objective would be to complete these treatments as quickly as possible.

PRIORITY 3: Inactive colony sites that are within 3 miles of an active colony site, and R/R stands with cavity trees. This is the most effective way to foster RCW population expansion, given the following assumptions: (1) the closer a colony site is to an active colony the higher the probability for that site to be colonized by dispersing woodpeckers, and (2) colony sites with a history of use have a higher probability of being recolonized by dispersing woodpeckers than sites without cavity trees. Within this priority group, higher priority will be given to those colony sites requiring a burn to maintain suitable midstory conditions than to colony sites requiring intensive techniques to control the midstory. Treatment costs would be the same as identified for active colony sites. About 27 percent of the total R/R treatment acres would fall into this priority group (15,820 acres). This would equate to 3,756 acres currently requiring maintenance burning per year at a cost of $34,209 per year, and 3,664 acres requiring intensive treatments at a total cost of $285,660. The amount of acres intensively treated per year would be dictated by budget constraints, but the objective would be to complete these treatments as quickly as possible. As work is completed on colony sites requiring intensive treatments, these acres will shift into a maintenance burning-schedule. To maintain midstory control on all these sites would require treatment of about 5,250 acres per year, at a cost of $79,000 per year.

PRIORITY 4: Inactive colony sites greater than 3 miles and R/R stands without cavity trees. Within this group, higher priority will be given to those colony sites requiring a burn to maintain suitable midstory conditions than to colony sites requiring intensive techniques to control the midstory. Treatment costs would be the same as identified for active colony sites. About 73 percent of the total R/R treatment acres would fall into this priority group (15,820 acres). This would equate to 3,756 acres requiring maintenance burning per year at a cost of $34,209 per year, and 3,664 acres requiring intensive treatments at a total cost of $285,660. The number of acres intensively treated per year would be dictated by budget constraints, but the objective would be to complete these treatments within 10 years. As work is completed on colony sites requiring intensive treatments, these acres will shift into a maintenance-burning schedule. To maintain midstory control on all these sites would require treatment of about 5,250 acres per year at a cost of $79,000 per year.

Table 24.--Annual cost projection*

	Active		*R/R*		*Total*
	Intense	*Burning*	*Intense*	*Burning*	
Year 1	$461.5	$65.7	0	0	$527.2
Year 2	0	$153.4	$105.8	$126.7	$385.9
Year 3	0	$105	$105.8	$147.1	$357.9
Years 4-10	0	$105	$105.8	$194.6	$405.4
decade sub-total:	$461.5	$1.059.1	$952.2	$1636	$4208.3
Year 11	$ 46.2	$105	$105.8	$194.6	$461.6
Year 12	0	$113.8	$211.6	$194.6	$520
Year 13	0	$105	0	$214	$319
Years 14-20	0	$105	0	$194.6	$299.6
decade sub-total:	$ 46.2	$1058.8	$317.4	$1965.4	$3397.8
TOTAL	$507.7	$2117.9	$1269.6	$3601.4	$7606.1

*Cost expressed in thousands of dollars

E. *Handbook Implementation*

District responses to questions concerning implementation of handbook guidelines and current condition of colony, replacement, recruitment and foraging stands indicate that, Regionwide, a wide range of compliance and involvement with RCW habitat management guidelines exists.

Colony monumentation (colony mapping, marking cavity trees) is near completion on a majority of districts. This is probably because the work is relatively inexpensive to accomplish and necessary for resource coordination. Unfortunately, most districts indicated that CISC data bases were not up to date. Active colonies, replacement, recruitment and foraging stand records are incomplete for most districts.

Compliance with hardwood midstory guidelines and colony replacement, recruitment and foraging stand overstory basal area requirements has not been a high management priority on all districts. Lack of handbook implementation since the original RCW handbook chapter approval in 1975 can be attributed to several factors on any particular district, including (1) inadequate or total lack of

funding, (2) misunderstanding concerning the "legal status" of the RCW handbook chapter, (3) inadequate staffing (e.g., no wildlife biologist on district) and (4) poor "ownership" in the RCW program. Solving the above and related problems will require a renewed FS commitment to develop a comprehensive, regionwide management strategy. The following chapter in this report, "Management Recommendations," identifies some of the strategies and programs needed to improve handbook implementation and other aspects of the RCW recovery effort.

F. *Budget Summary*

Threatened and endangered species habitat improvement protection and management (P&M) funds have been identifiable under a separate funding code since fiscal year 1984. Most of the nonstructural habitat improvement dollars (CT222) in the Region have been for RCW midstory control, and colony monumentation and mapping. Table 25 lists the Regional T&E nonstructural habitat improvement funding levels and acre targets reported in the final budgets between 1984 and 1986. The RCW habitat improvement budgets averaged $206,600 during this 3-year period--the habitat improvement acre targets have averaged 19,300 acres during the same period. These figures do not include habitat improvement work identifiable as not RCW related, or derived from other than allocated funds.

Table 25.--Regional T&E non-structural habitat improvement program

Year (FY)	*Budget**	*Acre target*
1984	183.0	18,535
1985	207.5	20,420
1986	216.7	19,249

*Budget expressed in thousands of dollars.

Table 26 lists the T&E nonstructural habitat improvement budget and targets (P&M) since FY-84 for each Forest with RCW habitat.

*Table 26.--Forest T&E nonstructural habitat improvement program summary**

	FY-84	FY-85	FY-86	FY-84 to 86 average
NFs in Alabama				
budget	29.5	29.0	26.9	28.4
acre target	6.2	6.0	4.4	5.5
Daniel Boone NF				
budget	0	0	8.7	2.9
acre target	0	0	0.5	0.17
Oconee NF				
budget	0	11	0	3.7
acre target	0	0.8	0	0.27
NFs in Florida				
budget	19.7	20.0	24.0	21.2
acre target	5.0	5.0	5.0	5.0
Kisatchie NF				
budget	40.64	36.0	33.5	36.7
acre target	3.0	3.0	3.9	3.3
NFs in Mississippi				
budget	16.9	16.0	18.4	20.4
acre target	1.0	1.0	1.8	1.3
Ouachita NF				
budget	15.2	26.0	23.4	21.5
acre target	1.0	1.1	1.0	1.0
NFs in North Carolina				
budget	31.3	20.5	26.2	26.0
acre target	0.2	2.0	0.1	0.77
Francis Marion-Sumter NFs				
budget	10.0	22.0	23.1	18.4
acre target	2.0	1.5	2.1	1.9
NFs in Texas				
budget	19.9	27.0	26.5	24.5
acre target	0.1	0	0.4	0.17

*Budgets expressed in thousands of dollars; acre targets expressed in thousands of acres.

G. *Recovery*

The Forest Service has a leadership role in RCW recovery. Seventy percent of the active colonies identified on federal lands in 1980 are on National Forests in the Southern Region. At least 15 populations with greater than 250 active colonies, documented stable to increasing trends and representing all the major geographic provinces and forested types presently occupied by the species, are required for delisting the RCW as recovered. Twelve of these recovery populations are on national forests. Only three (Apalachicola, Francis Marion, and Vernon) out of the 12 FS recovery

populations are above the 250-active-colony level, while four (Croatan, Desoto, Oconee, Talladega) of these populations currently have a high risk of becoming extinct. Four (Conecuh, Croatan, Ocala, and Talladega) identified FS recovery population areas have insufficient habitat to support the 250-active-colony viability level. These four populations will require cooperative agreements with adjacent land owners or agencies to include sufficient habitat for recovery. The RCW Recovery Plan identifies that at least six populations with greater than 250 active colonies exhibiting stable to increasing population trends are required for down listing the species to Threatened. Four of the six populations identified are on National Forests (Francis Marion, Apalachicola, Desoto, and Kisatchie). Three of these populations meet the down-listing criteria, but the Desoto population does not. The Desoto population is actually at high risk of becoming extinct. Down-listing the RCW to Threatened will be contingent upon our ability to recover the Desoto population. Given the current population status and age class time lag for the Desoto NF this could take over 20 years to achieve. Recovery of the RCW will require a long-term FS conservation and management program.

V. *MANAGEMENT RECOMMENDATIONS*

The data in this report provides the first comprehensive, detailed look at the RCW population and its associated habitat throughout the Southern Region. The RCW is the only nonlocalized endangered species whose future rests primarily with the Forest Service. Given the current status and trend of many RCW populations and the criteria required for "recovery", it is evident that we have a long-term management challenge ahead of us. A leadership role for successful species recovery demands strong agency commitment, aggressive conservation strategies and adequate financial support. The districts' responses to the RCW questionnaire and the data analysis presented in this report have helped identify and clarify the management needs required for RCW conservation. Each of the management recommendations will be identified and briefly discussed below. Comprehensive implementation strategies for each recommendation or program should be cooperatively developed by Regional and Forest staff and interested cooperators, as needs are identified.

A. *Personnel Staffing*

Adequate staffing is imperative if RCW management is to improve at the district level. Biologist or wildlife technical expertise must be available for all RCW populations. Resource coordination needs, habitat improvement projects, data base management, and population monitoring responsibilities all require substantial investments in time, even in relatively small populations (less than 100 active colonies). In populations with 250 plus colonies, one person will probably be insufficient to maintain a quality RCW program and accomplish other district wildlife responsibilities. Very small populations (less than 50 active colonies) with a risk of extinction may require more intensive management (cavity restrictor program, augmentation, frequent monitoring for clan viability status, etc.) than larger, healthy populations. Wildlife personnel must be available to manage these populations.

B. *RCW Education and Information Exchange*

A primary responsibility of wildlife staff is to inform and involve the rest of the FS team and the public about the RCW. Endangered species recovery is the responsibility of all FS employees, not just the biologists. Opportunities to discuss RCW life history, ecology, and management and the FS role in recovery should be aggressively pursued by wildlife staff. Positive attitudes about threatened

and endangered species values should be developed and fostered in all FS employees. Additionally, innovative and informative programs to both educate and involve the public in FS RCW programs are critical to recovery efforts. Colony auto tours, Adopt-A-Clan programs, slide shows, and information pamphlets are all valuable techniques for increasing the publics awareness about RCWs.

C. *Budget Strategy*

Numerous districts highlighted an inadequate and inconsistent budget as a primary obstacle to a well planned and comprehensive RCW program. Management problems associated with inadequate funding include: insufficient staffing to accomplish population monitoring responsibilities, noncompliance with habitat management guidelines (unacceptable midstory conditions), and the inability to develop and maintain a computer data base. Currently a major portion of the Region's T&E budget is spent on RCW program support. A majority of that money is allocated for direct habitat improvement, while the remainder is for colony monumentation, population surveys and monitoring.

The average T&E habitat improvement budget (1984-1986) of $206,000 is a fraction of what is needed for midstory control work with RCW, let alone all the other elements of the RCW recovery program. A doubling of our historic budget will be required to achieve the midstory control program outlined in Table 24. Our historic budget is not even sufficient to maintain suitable nesting habitat with a burning program on the acres needed for recovery. An estimated $2 to 4 million per year may be needed for the entire RCW recovery effort, including augmentation and monitoring costs. In summary, if districts and forests are going to build RCW programs with species recovery as the objective, funding must be programed into the outyear budgets so the personnel and habitat improvement projects necessary for RCW conservation can be put into place.

D. *Computer Data Base*

The majority (73 percent) of the districts support development of a standardized computer data base. Districts want a data base capable of both storing and summarizing population and habitat data. Specifically, a data base could be used to:

1. plan the annual program of work for colony, replacement, recruitment and foraging stand habitat improvement projects.

2. generate data tables and summaries for district, forest and regional reports.

3. better integrate the RCW program into other resource planning and management activities.

4. provide a historical record for assessing population status and monitoring population trends.

The existing inconsistencies in data storage, record keeping, and annual reporting create significant problems when aggregating forest-level RCW population data for Regional (species or recovery level) status, trend, habitat and/or budget analysis summaries or reports. RCW species recovery involves populations from 12 Forests and their associated districts. Additionally, ten other forests have RCW populations. The ability to store and summarize data in a similar fashion for all the populations has obvious merit. The data base should be developed for the Data General system.

E. *Population Priority Management*

Recognizing that funding will not be available for all projects in all populations, it is necessary to prioritize where and how RCW dollars will be spent. The objective of this strategy is to maximize each dollar's effectiveness while striving to meet recovery objectives.

Factors to consider when allocating limited funds include the role a particular population contributes to recovery, existing population risk, expected probability of program success, and the lag time before results can be expected. As an example, after consideration of the above and perhaps other factors, a forest may decide to invest its allocated RCW funds on augmenting a declining district recovery population and forego RCW habitat improvement projects on a district with an extinct non-recovery population, even though that district may have a FS population goal.

F. *Hardwood Midstory Management*

Although hardwood midstory encroachment problems vary throughout the Region, about 50 percent of the districts reported less than 50 percent of their active colonies and R/R stands meet handbook midstory guidelines. About 25 percent of the Districts indicated 100 percent of their colonies and R/R stands satisfy those guidelines. Midstory encroachment has contributed to population declines and extinctions on several forests in the Region. Reversing this trend, while eliminating that backlog of work, will require a carefully planned and expensive habitat improvement strategy. The midstory strategy must be aggressive, identify treatment priorities and associated costs (among and within populations), and contain realistic and attainable habitat improvement and maintenance implementation schedules. Because of the importance and immediacy of midstory problems, a detailed midstory strategy has been developed as part of this report. That strategy is presented in the Habitat Management portion of the Discussion section.

G. *Population Monitoring*

RCW monitoring to determine either population size or trend is the key component driving most other RCW program decisions. In addition to identifying population status, monitoring enables managers to assess effectiveness of management programs. Regionwide, forests are currently employing several types of monitoring systems, at various frequencies. Additionally, several methods are used to determine colony status and the number of active colonies (cavity tree aggregation). Differences in RCW handbook interpretation, Land Management Plan direction and personnel expertise contribute to monitoring inconsistencies throughout the Region. Because recovery is a regional objective involving many forests, a standardized monitoring system would benefit conservation efforts.

Within a standardized system, different intensities and frequencies of monitoring may be necessary due to population size. For instance, in very small populations (less than 50 active colonies) all colonies should probably be checked for status on an annual basis. With recent evidence suggesting that small populations are capable of rapid declines, annual monitoring is critical to detect those

possible changes. However, funding, time, and logistical constraints preclude annual monitoring of all colonies in large populations. Large populations are best monitored by statistically sampling the population at a frequency rate capable of detecting desired levels (percent change) of population differences over time. Regardless of the monitoring strategy employed, it is essential that all forests use similar criteria for determining colony (e.g. cavity tree) status and for estimating the number of colonies in a given population. Well-researched and accepted techniques exist for both of these parameters, Hooper and others (1980) have described techniques concerning cavity tree status, and Harlow and others (1983) offer guidelines for calculating colony numbers. The value and importance of an accurate, comprehensive and functional monitoring program, capable of estimating current population size and detecting population trends (stable, increasing or decreasing), for all RCW populations cannot be overemphasized.

H. *Augmentation*

Longterm conservation efforts for RCWs will, for some populations, require innovative hands-on management with RCWs, in addition to habitat improvement projects. In particular, very small (<50 active colonies), declining populations are prime candidates for an augmentation program. These populations have a potentially high risk of extintion. RCW augmentation is basically a "new science" and remains untested within National Forest Systems as a management tool. However, several recent successful colony augmentations by FS research personnel (M. Lennartz, pers. comm.) give great promise to the applicability of the technique for stabilizing small, declining populations. Because of potential rapid declines in small populations, due to clan viability loss, an augmentation strategy has recently (March 1988) been developed. The strategy is contained within the Southern Region RCW Clan Augmentation Biological Evaluation (dated March 30, 1988, and prepared by Ronald E. F. Escano) and the USDI, Fish and Wildlife Service nonjeopardy opinion letter dated May 13, 1988, and signed by James W. Pulliam. Those documents discuss in detail the necessity, applicability, and procedure of augmentation. Augmentation should proceed for candidate populations as soon as needs are identified and funds and expertise are available.

I. *Research*

Many facets of RCW life history and ecology have been studied during the last 20 years. However, numerous research opportunities remain available and deserve attention. Habitat requirement studies in, as yet uninvestigated, portions of RCW range may help refine Forest timber management programs. In the near future, opportunities to evaluate RCW responses to midstory control and other cultural and silvicultural treatments will be available. Augmentation projects and associated intensive monitoring requirements may provide opportunities to examine several aspects of cavity competition within colony sites. Wildlife personnel with imaginative ideas and flexible programs can take advantage of and indeed create opportunities to enlist graduate students, local bird enthusiasts, volunteers, university professors, state biologists, independent consultants, FS research biologists, and others to assist in cooperative research endeavors. Funding possibilities include appropriate district and forest dollars, challenge cost-share funds, State nongame research programs and local and national conservation organization (e.g. Audubon Society) funds.

J. *Interagency and Cooperative Management*

Although the FS is recognized as one of the primary agencies responsible for RCW recovery, opportunities for other agencies and land owners with RCW populations to assist in the effort should be more aggressively pursued. Several FS populations are adjacent to other Federal properties (military bases, wildlife refuges) with RCWs. In some cases, nearby State parks or forests harbor RCW colonies. FS personnel should take a lead role in actively involving these adjacent land owners (managers) in a cooperative management program. Opportunities may exist to share expertise, personnel, equipment, and data gathering efforts. Habitat improvement and maintenance projects could be cooperatively planned and accomplished. Memoranda of understanding or cooperative agreements could be designed for each particular situation. The document would outline cooperatively agreed-upon objectives, responsibilities and commitments. With increasing concerns about the viability of small populations, it is becoming increasingly important to involve all landowners with RCW populations in recovery efforts.

K. *RCW Handbook Chapter (420) Revision and RCW Environmental Impact Statement*

Almost 50 percent of the districts indicated they had problems interpreting the current RCW handbook chapter. Districts also highlighted several RCW management issues that are poorly covered or not discussed at all in the handbook.

District concerns included timber management options in high RCW populations, revising the handbook chapter to reflect decisions approved in the Southern Pine Beetle Suppression Environmental Impact Statement, and lack of direction on monitoring.

A RCW handbook chapter revision at this time would not only respond to district and forest concerns, but also provide an opportunity to address and develop strategies for several previously-discussed management recommendations. In particular, a handbook revision could (1) update population status, (2) establish priorities for population management, (3) present a standardized computer data base with schedules for required annual reports (4) provide clarification and specific direction for colony, replacement, recruitment and foraging stand management, including a midstory strategy, (5) provide a standardized monitoring program, (6) outline and reference the RCW augmentation biological evaluation and reinforce that strategies role in the Regionwide RCW program, and (7) discuss opportunities and procedures for building programs in the areas of staffing, budgeting, information and education, cooperative management and research. Examples of successful programs in the above areas could be presented.

A RCW handbook revision differs from most other Wildlife Habitat Management Handbook chapters in that it must go through the USDI Fish and Wildlife Service consultation process. Once approved with a nonjeopardy opinion, the RCW handbook is not a management guidelines document, but a document specifying required procedures and practices. Because of this difference from other handbook chapters, the multi-agency responsibilities for recovery, and the many recent and ongoing management issues, public concerns, legal questions, research findings, and political and economic factors that permeate RCW conservation, we believe an environmental impact statement (EIS) will be necessary to address the future direction of RCW management, recovery and conservation in the Southern Region. The handbook chapter revision would logically develop from the EIS.

Approximately 2 years will be required to complete a RCW EIS and associated RCW handbook chapter revision.

VI. *CONCLUSION*

This report summarizes the findings of the Regional RCW Survey completed in 1987 by all Region 8 districts containing RCW colonies. In addition, a Management Recommendations section has been included. The survey was made to answer important questions concerning (1) the status and trends of RCW populations, (2) the state of the art of RCW monitoring programs, (3) availability, status, and habitat improvement needs of nesting and foraging habitat, (4) RCW handbook chapter implementation and (5) funding requirements.

In reference to the above questions, following are the major findings of the RCW survey and this report:

(1) There are 2,115 active RCW colonies on 21 national forests in the Southern Region. Rangewide the population is unevenly distributed and fragmented. Sixty-six percent of the populations are small (<50 active colonies); 67 percent have declining population trends and 5 populations have disappeared since 1970.

(2) RCW monitoring intensity, frequency and quality varies significantly within the Region. A majority (90 percent) of districts completed some colony surveys in 1985 or 1986. In 1986, 28 percent of all known colonies were visited. During a given survey year, 60 percent of the districts complete a 100-percent survey of all known colony sites.

(3) Habitat availability, current conditions, and improvement needs vary considerably throughout the Region. In general, due to the present age of forest stands, there will be little increase in suitable nesting habitat for at least 10 years, and most populations will remain in this habitat "bottleneck" for 20 to 30 years. Hardwood midstory encroachment is a significant problem on about 50 percent of the districts; midstory control should be a habitat improvement priority. Overstory basal area of colony, R/R, and foraging stands and availability of foraging habitat were not identified as significant concerns.

(4) Although some districts have made a concerted effort to implement the RCW handbook chapter, district responses to habitat improvement and handbook implementation questions indicate that, in general, handbook compliance ranges from poor to good. Compliance is a function of several factors, as described in Discussion section E. Implementation of this report's proposed Management Recommendations will contribute significantly to achieving handbook compliance.

(5) RCW recovery will be expensive. For example, hardwood midstory control and maintenance programs for active colonies and R/R stands will cost about $4,208,800 during the first decade. This cost does not include hiring more biologists, developing a computer data base, population monitoring, augmentation projects, or RCW EIS preparation and handbook chapter revision. If RCW recovery is to be a reality in the Southern Region, significant budget increases will be necessary during the next decade of RCW conservation.

In addition to addressing the above issues, this report has another important purpose. The report's data and findings will serve as a base, against which future measurements and management

program successes can be compared. In conjunction with this effort, forests with RCW populations will be asked to submit annual reports. These reports will cover status and trend of RCW populations, habitat improvement accomplishments, monitoring program results and other relevant information. We anticipate repeating the 66-question data sheet in the mid-1990's, a decade after the initial questionnaire.

The tasks ahead in RCW conservation are many and varied. New Regionwide planning and management documents are needed. An EIS addressing RCW management and recovery for the Southern Region and a revised handbook chapter (420) will cover those needs. Development of a Regionwide computerized data base is vital for accurate and efficient record keeping. Monitoring programs should be standardized, implemented in all populations at the proper frequency and intensity and used to adjust or refine population management programs and habitat improvement and maintenance practices. Augmentation should proceed as soon as possible in small populations; particularly if they will remain in a habitat bottleneck for 20 to 30 more years. A significant increase in habitat improvement is needed during the next several years to bring all colony and R/R stands into midstory and basal area compliance. Of course, most of these tasks depend on increases in budgets and personnel. Evidence of increases in both these critical areas already exists. These increases are encouraging and will hopefully lead to renewed and increased RCW management and recovery efforts in the 1990's.

The Southern Region has a formidable conservation effort ahead, as it carries out its responsibilities for RCW recovery. The RCW Recovery Plan summarizes what is needed for RCW recovery:

"The survival of the red-cockaded woodpecker ultimately depends on halting the loss of nesting habitat and providing adequate acreage in old-growth pines in perpetuity. Merely protecting existing colonies will delay extinction but not prevent it. A continuing supply of old-growth habitats is required to replace colonies lost or abandoned and to provide for population expansion."

VII. LITERATURE CITED

Hamel, Paul Analysis of red-cockaded woodpecker habitat on NF lands. Clemson, SC, U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station. (unpublished). 32 p.

Harlow, Richard F.; Hooper, Robert G.; Lennartz, Michael R. 1983. Estimating numbers of red-cockaded woodpecker colonies. Wildlife Society Bulletin. 11:360-363.

Hooper, Robert G.; Robinson, Andrew F., Jr.; Jackson, Jerome A. 1980. The red-cockaded woodpecker: Notes on life history and management. SA-GR 9. Atlanta: U.S. Dept. of Agriculture, Forest Service, Southeastern Area. 8 p.

Lennartz, Michael R.; Geissler, Paul H.; Harlow, Richard F.; Long Randall C.; Chitwood, Kenneth M.; Jackson, Jerome A. 1983. Status of the red-cockaded woodpecker on Federal lands in the South. In: Wood, D.A.,ed. Red-cockaded woodpecker symposium II proceedings. Tallahassee. FL: State of Florida Game and Fresh Water Fish Commission: 7-12.

Ligon, J. David; Stacey, Peter B.; Conner, Richard N.; Bock, Carl E.; Adkisson, Curtis S. 1986. Report of the American Ornithologists' Union Committee for the Conservation of the Red-cockaded Woodpecker. AUK. 103:848-855.

Thompson, Richard L., ed. 1971. The ecology and management of the red-cockaded woodpecker, proceedings. Okefenokee National Wildlife Refuge, GA: U.S. Bureau of Sport Fisheries and Wildlife, and Tall Timbers Research Station. 188 p.

U.S. Department of Agriculture, Forest Service, Southern Region. 1975. Wildlife habitat management handbook, chapter 420, red-cockaded woodpecker. Forest Service Handbook 2609.23R. Atlanta. (unpublished administrative document).

U.S. Department of Agriculture, Forest Service, Southern Region. 1979. Wildlife habitat management handbook, chapter 420, red-cockaded woodpecker. Forest Service Handbook 2609.23R. Atlanta. (unpublished administrative document).

U.S. Department of Agriculture, Forest Service, Southern Region. 1985. Wildlife habitat management handbook, chapter 420, red-cockaded woodpecker Forest Service Handbook 2609.23R. Atlanta. (unpublished administrative document).

U.S. Department of the Interior, Fish and Wildlife Service. 1968. Rare and endangered fish and wildlife of the United States. U.S. Sport Fisheries and Wildlife Resource Publication 34. Washington.

U.S. Department of the Interior, Fish and Wildlife Service. 1970. Listing of red-cockaded woodpecker as endangered. Federal Register. 35:16047. October 13, 1970.

U.S. Department of the Interior, Fish and Wildlife Service, Region 4. 1979. Red-cockaded woodpecker recovery plan. Atlanta. 38 p.

U.S. Department of the Interior, Fish and Wildlife Service, Region 4. 1985. Red-cockaded woodpecker recovery plan. Atlanta. 88 p.

LIST OF INDIVIDUALS COMPLETING DATA SHEET

Appendix I

A2 NATIONAL FOREST	A3 DISTRICT	A6 NAME	A7 PHONE	A8 DATE
Angelina	Angelina	L.Bonner	409-639-8537	Apr 30 87
Apalachicola	Apalachicola	M.Balboni	904-926-3561	May 26 87
Apalachicola	Wakulla	M.Balboni	904-926-3561	May 26 87
Bankhead	Bankhead	G.Gaines	205-489-5111	Apr 87
Bienville	Bienville	D.Daniel	601-782-4271	Apr 13 87
Bienville	Strong River	D.Daniel	601-782-4271	Apr 13 87
Chatt-Oconee	Hitchiti	W.Guthrie	404-468-2244	Apr 27 87
Chatt-Oconee	Oconee	W.Guthrie	404-468-2244	Apr 28 87
Cherokee	Ocoee	J.Dabney	615-476-9700	Apr 16 87
Conecuh	Conecuh	LeMaire/Risner	205-222-2555	Apr 27 87
Croatan	Croatan	Hillman/Leavitt	704-257-4305	Apr 8 87
Danial Boone	London	K.Spielman	606-679-2010	May 13 87
Danial Boone	Somerset	K.Spielman	606-679-2010	May 13 87
Danial Boone	Stearns	K.Spielman	606-679-2010	May 13 87
Davy Crockett	Neches	R.Mize	409-831-2246	Apr 87
Davy Crockett	Trinity	R.Mize	409-831-2246	Apr 87
DeSoto	Biloxi	H.Pawelczyk	601-928-4422	Apr 15 87
DeSoto	Black Creek	Pawelczyk/Smistik	601-928-4422	Apr 14 87
DeSoto	Chickasawhay	Pawelczyk/Barwick	601-928-4422	Apr 16 87
DOE-SR Plant	SRFS	B.Austin	FTS 239-2441	Apr 87
Francis Marion	Wambaw	D.Carlson	803-887-3311	Apr 10 87
Francis Marion	Witherbee	D.Krusac	803-336-3248	Apr 22 87
Homochitto	Bude	N.Covington	601-873-6256	Apr 27 87
Homochitto	Homochitto	D.Hancock	601-225-4281	Apr 27 87
Kisatchie	Caney	J.Hogan	FTS 497-7160	Apr 24 87
Kisatchie	Catahoula	J.Hogan	FTS 497-7192	Apr 24 87
Kisatchie	Winn	J.Hogan	FTS 497-7192	Apr 24 87
Kisatchie	Evangeline	W.Wilkinson	318-445-9396	Apr 21 87
Kisatchie	Kisatchie	R.Costa	318-352-2568	May 1 87
Kisatchie	Vernon	K.Lane	318-239-6576	Apr 29 87
Ocala	Lake George	Elsen/Shenk	904-625-2520	May 2 87
Ocala	Seminole	D.Elsen	904-669-5081	May 2 87
Osceola	Osceola	Naylor/Conner	904-752-2557	May 11 87
Ouachita	Cold Springs	D.Bastion	501-675-3233	Apr 29 87
Ouachita	Mena	J.Mawk	501-394-2382	May 5 87
Ouachita	Poteau	W.Montague	501-637-4174	May 4 87
Ouachita	Fourche	R.Mitchell		Nov 1 87
Sabine	Tenaha	M.Robertson	409-275-2632	Apr 7 87
Sabine	Yellowpine	M.Robertson	409-787-3870	Apr 8 87
Sam Houston	Raven	J.Davis	713-592-6461	Apr 26 87
Sam Houston	San Jacinto	J.Davis	713-592-6461	Apr 24 87
Sumter	Enoree	B.Harrell	803-276-4810	Jun 22 87
Sumter	Long Cane	D.Ray	803-229-2406	Jun 22 87
Sumter	Tyger	A.Schenck	803-427-9858	Jun 22 87
Sumter	Edgefield	A.Boldog	803-637-5396	Jun 16 87
Talladega	Oakmulgee	C.Oliver	205-926-9765	Apr 28 87
Talladega	Shoal Creek	E.Graves	205-463-2272	Apr 16 87
Talladega	Talladega	D.Lyons	205-362-2909	Apr 17 87
Tombigbee	Tombigbee	L.Clay	601-285-3264	Apr 8 87
Tuskegee	Tuskegee	B.Banker	205-727-2652	Apr 27 87
Uwharrie	Uwharrie	Hillman/Sanders	704-257-4305	Apr 21 87

LIST OF RCW POPULATIONS

Appendix II

A1 RCW POPULATION	A2 NATIONAL FOREST	A3 DISTRICT	A4 STATE
Angelina-Sabine	Angelina	Angelina	Texas
Angelina-Sabine	Sabine	Tenaha	Texas
Angelina-Sabine	Sabine	Yellowpine	Texas
Apalachicola	Apalachicola	Apalachicola	Florida
Apalachicola	Apalachicola	Wakulla	Florida
Bankhead	Bankhead	Bankhead	Alabama
Bienville	Bienville	Bienville	Mississippi
Bienville	Bienville	Strong River	Mississippi
Caney	Kisatchie	Caney	Louisiana
Catahoula-Winn	Kisatchie	Catahoula	Louisiana
Catahoula-Winn	Kisatchie	Winn	Louisiana
Cherokee	Cherokee	Ocoee	Tennessee
Conecuh	Conecuh	Conecuh	Alabama
Croatan	Croatan	Croatan	North Carolina
Danial Boone	Danial Boone	London	Kentucky
Danial Boone	Danial Boone	Somerset	Kentucky
Danial Boone	Danial Boone	Stearns	Kentucky
Davy Crockett	Davy Crockett	Neches	Texas
Davy Crockett	Davy Crockett	Trinity	Texas
DeSoto	DeSoto	Biloxi	Mississippi
DeSoto	DeSoto	Black Creek	Mississippi
DeSoto	DeSoto	Chickasawhay	Mississippi
Francis Marion	Francis Marion	Wambaw	South Carolina
Francis Marion	Francis Marion	Witherbee	South Carolina
Homochitto	Homochitto	Bude	Mississippi
Homochitto	Homochitto	Homochitto	Mississippi
Sumter	Sumter	Enoree	South Carolina
Sumter	Sumter	Long Cane	South Carolina
Sumter	Sumter	Tyger	South Carolina
Oakmulgee	Talladega	Oakmulgee	Alabama
Ocala	Ocala	Lake George	Florida
Ocala	Ocala	Seminole	Florida
Oconee	Chatt-Oconee	Hitchiti	Georgia
Oconee	Chatt-Oconee	Oconee	Georgia
Osceola	Osceola	Osceola	Florida
Ouachita	Ouachita	Cold Springs	Arkansas
Ouachita	Ouachita	Mena	Arkansas
Ouachita	Ouachita	Poteau	Arkansas
Ouachita	Ouachita	Fourche	Arkansas
Sam Houston	Sam Houston	Raven	Texas
Sam Houston	Sam Houston	San Jacinto	Texas
Savannah River	DOE-SR Plant	SRFS	South Carolina
Sumter	Sumter	Edgefield	South Carolina
Talladega	Talladega	Shoal Creek	Alabama
Talladega	Talladega	Talladega	Alabama
Tuskegee	Tuskegee	Tuskegee	Alabama
Ver-Evang-Kisatchie	Kisatchie	Evangeline	Louisiana
Ver-Evang-Kisatchie	Kisatchie	Kisatchie	Louisiana
Ver-Evang-Kisatchie	Kisatchie	Vernon	Louisiana

RCW POPULATIONS SORTED BY GEOGRAPHIC PROVINCES

Appendix II

A1 RCW POPULATION	A2 NATIONAL FOREST	A3 DISTRICT	A5 PROVINCE
Cherokee	Cherokee	Ocoee	Appalachian Highlands
Bankhead	Bankhead	Bankhead	Cumberland Plateau
Danial Boone	Danial Boone	London	Cumberland Plateau
Danial Boone	Danial Boone	Somerset	Cumberland Plateau
Danial Boone	Danial Boone	Stearns	Cumberland Plateau
Ouachita	Ouachita	Cold Springs	Interior Highlands
Ouachita	Ouachita	Mena	Interior Highlands
Ouachita	Ouachita	Poteau	Interior Highlands
Ouachita	Ouachita	Fourche	Interior Highlands
Angelina-Sabine	Sabine	Tenaha	Lower Coastal Plain
Angelina-Sabine	Sabine	Yellowpine	Lower Coastal Plain
Apalachicola	Apalachicola	Apalachicola	Lower Coastal Plain
Apalachicola	Apalachicola	Wakulla	Lower Coastal Plain
Bienville	Bienville	Strong River	Lower Coastal Plain
Croatan	Croatan	Croatan	Lower Coastal Plain
Davy Crockett	Davy Crockett	Neches	Lower Coastal Plain
Davy Crockett	Davy Crockett	Trinity	Lower Coastal Plain
DeSoto	DeSoto	Biloxi	Lower Coastal Plain
DeSoto	DeSoto	Black Creek	Lower Coastal Plain
DeSoto	DeSoto	Chickasawhay	Lower Coastal Plain
Francis Marion	Francis Marion	Wambaw	Lower Coastal Plain
Francis Marion	Francis Marion	Witherbee	Lower Coastal Plain
Ocala	Ocala	Lake George	Lower Coastal Plain
Ocala	Ocala	Seminole	Lower Coastal Plain
Osceola	Osceola	Osceola	Lower Coastal Plain
Sam Houston	Sam Houston	Raven	Lower Coastal Plain
Sam Houston	Sam Houston	San Jacinto	Lower Coastal Plain
Ver-Evang-Kisatchie	Kisatchie	Vernon	Lower Coastal Plain
Homochitto	Homochitto	Homochitto	Lower Thin Loess
Oconee	Chatt-Oconee	Hitchiti	Piedmont
Oconee	Chatt-Oconee	Oconee	Piedmont
Sumter	Sumter	Enoree	Piedmont
Sumter	Sumter	Long Cane	Piedmont
Sumter	Sumter	Tyger	Piedmont
Sumter	Sumter	Edgefield	Piedmont
Talladega	Talladega	Shoal Creek	Piedmont
Talladega	Talladega	Talladega	Piedmont
Angelina-Sabine	Angelina	Angelina	Upper Coastal Plain
Bienville	Bienville	Bienville	Upper Coastal Plain
Caney	Kisatchie	Caney	Upper Coastal Plain
Catahoula-Winn	Kisatchie	Catahoula	Upper Coastal Plain
Catahoula-Winn	Kisatchie	Winn	Upper Coastal Plain
Conecuh	Conecuh	Conecuh	Upper Coastal Plain
Homochitto	Homochitto	Bude	Upper Coastal Plain
Oakmulgee	Talladega	Oakmulgee	Upper Coastal Plain
Savannah River	DOE-SR Plant	SRFS	Upper Coastal Plain
Tuskegee	Tuskegee	Tuskegee	Upper Coastal Plain
Ver-Evang-Kisatchie	Kisatchie	Evangeline	Upper Coastal Plain
Ver-Evang-Kisatchie	Kisatchie	Kisatchie	Upper Coastal Plain

COLONY SURVEY STATUS SUMMARY

Appendix III

A1 RCW POPULATION	A3 DISTRICT	B10 OBJ	B1 #COL	B6 #ACT	B9 TREND
Angelina-Sabine	Angelina	168	60	22	decreasing
Angelina-Sabine	Tenaha	100	30	16	decreasing
Angelina-Sabine	Yellowpine	82	34	8	decreasing
Apalachicola	Apalachicola	477	441	346	stable
Apalachicola	Wakulla	349	221	141	stable
Bankhead	Bankhead	50	9	1	decreasing
Bienville	Bienville	unknown	176	127	decreasing
Bienville	Strong River	unknown	5	0	extirpated
Caney	Caney	20	3	0	extirpated
Catahoula-Winn	Catahoula	70	59	42	decreasing
Catahoula-Winn	Winn	55	68	40	decreasing
CherokKee	Ocoee	none	1	1	decreasing
Conecuh	Conecuh	125	51	32	stable
Croatan	Croatan	90	67	50	decreasing
Danial Boone	London	unknown	16	2	decreasing
Danial Boone	Somerset	unknown	8	3	decreasing
Danial Boone	Stearns	unknown	4	2	decreasing
Davy Crockett	Neches	56	73	26	decreasing
Davy Crockett	Trinity	69	41	4	decreasing
DeSoto	Biloxi	82	23	9	stable
DeSoto	Black CreeK	68	25	5	decreasing
DeSoto	Chickasawhay	103	27	11	stable
Francis Marion	Wambaw	238	232	220	stable
Francis Marion	Witherbee	262	277	263	stable
Homochitto	Bude	unknown	15	8	decreasing
Homochitto	Homochitto	unknown	50	32	decreasing
none	Tombigbee	none	3	0	extirpated
none	Uwharrie	none	25	0	extirpated
Oakmulgee	Oakmulgee	250	325	195	stable
Ocala	Lake George	61	42	18	increasing
Ocala	Seminole	77	19	4	decreasing
Oconee	Hitchiti	10	13	10	stable
Oconee	Oconee	40	10	2	decreasing
Osceola	Osceola	250	98	55	stable
Ouachita	Cold Springs	2	1	1	decreasing
Ouachita	Fourche		1	1	
Ouachita	Mena	2	2	2	stable
Ouachita	Poteau	32	16	16	stable
Sam Houston	Raven	190	185	85	decreasing
Sam Houston	San Jacinto	60	56	27	decreasing
Savannah River	SRFS	40	21	3	augmented
Sumter	Edgefield	10	10	0	extirpated
Sumter	Enoree	none	1	0	extirpated
Sumter	Long Cane	none	2	0	extirpated
Sumter	Tyger	none	1	0	extirpated
Talladega	Shoal CreeK	65	67	1	decreasing
Talladega	Talladega	125	75	10	decreasing
TusKegee	TusKegee	21	2	0	extirpated
Ver-Evang-Kisatchie	Evangeline	50	52	50	increasing
Ver-Evang-Kisatchie	Kisatchie	100	104	71	stable
Ver-Evang-Kisatchie	Vernon	250	210	153	increasing

COLONY SURVEY STATUS SUMMARY

Appendix III

A1 RCW POPULATION	A3 DISTRICT	B6 #ACTIVE	B6.1 A	B7 SURVEY METHOD
Angelina-Sabine	Angelina	22	1987	nesting
Angelina-Sabine	Tenaha	16	1986	cavity
Angelina-Sabine	Yellowpine	8	1986	cavity
Apalachicola	Apalachicola	346	1987	cavity
Apalachicola	Wakulla	141	1987	cavity
Bankhead	Bankhead	1	1986	cavity/birds
Bienville	Bienville	127	1986	cavity
Bienville	Strong River	0	1986	cavity
Caney	Caney	0	1986	cavity
Catahoula-Winn	Catahoula	42	1986	cavity/birds
Catahoula-Winn	Winn	40	1987	cavity
Cherokee	Ocoee	1	1987	birds
Conecuh	Conecuh	32	1983	cavity
Croatan	Croatan	50	1984	birds
Danial Boone	London	2	1986	cavity
Danial Boone	Somerset	3	1986	cavity
Danial Boone	Stearns	2	1987	cavity
Davy Crockett	Neches	26	1987	cavity/birds
Davy Crockett	Trinity	4	1987	cavity/birds
DeSoto	Biloxi	9	1985	cavity/birds
DeSoto	Black Creek	5	1985	cavity/birds
DeSoto	Chickasawhay	11	1985	cavity/birds
Francis Marion	Wambaw	220	1987	all methods
Francis Marion	Witherbee	263	1987	all methods
Homochitto	Bude	8	1987	cavity
Homochitto	Homochitto	32	1985	cavity
none	Tombigbee	0	1987	unknown
none	Uwharrie	0	1978	cavity/birds
Oakmulgee	Oakmulgee	195	1987	cavity
Ocala	Lake George	18	1986	cavity/birds
Ocala	Seminole	4	1987	cavity/birds
Oconee	Hitchiti	10	1986	nesting
Oconee	Oconee	2	1985	birds
Osceola	Osceola	55	1986	cavity
Ouachita	Cold Springs	1	1986	birds
Ouachita	Fourche	1	1987	
Ouachita	Mena	2	1987	birds
Ouachita	Poteau	16	1986	all methods
Sam Houston	Raven	85	1987	cavity/birds
Sam Houston	San Jacinto	27	1987	cavity/birds
Savannah River	SRFS	3	1987	nesting
Sumter	Edgefield	0	1985	cavity/birds
Sumter	Enoree	0	1960's	cavity/birds
Sumter	Long Cane	0	1960's	unknown
Sumter	Tyger	0	1960's	unknown
Talladega	Shoal Creek	1	1987	cavity
Talladega	Talladega	10	1986	cavity/birds
Tuskegee	Tuskegee	0	1986	cavity
Ver-Evang-Kisatchie	Evangeline	50	1986	cavity
Ver-Evang-Kisatchie	Kisatchie	71	1986	all methods
Ver-Evang-Kisatchie	Vernon	153	1987	cavity/birds

COLONY AGGREGATION METHODS

Appendix III

A1 RCW POPULATION	A3 DISTRICT	B1 #COLONIES	B1.1	B3 COLONY METHOD
Angelina-Sabine	Angelina	60	1986	1500' circle
Angelina-Sabine	Tenaha	30	1986	1500' circle
Angelina-Sabine	Yellowpine	34	1986	1500' circle
Apalachicola	Apalachicola	441	1987	all methods
Apalachicola	Wakulla	221	1987	all methods
Bankhead	Bankhead	9	1986	field mapping
Bienville	Bienville	176	1986	1500' circle
Bienville	Strong River	5	1986	1/4 mile circle
Caney	Caney	3	1986	1500' circle
Catahoula-Winn	Catahoula	59	1986	1500'/nest site
Catahoula-Winn	Winn	68	1981	1500' circle
Cherokee	Ocoee	1	1987	field mapping
Conecuh	Conecuh	51	1983	field mapping
Croatan	Croatan	67	1985	field mapping
Danial Boone	London	16	1986	1500' circle
Danial Boone	Somerset	8	1986	1500' circle
Danial Boone	Stearns	4	1987	1500' circle
Davy Crockett	Neches	73	1987	1500'/field map
Davy Crockett	Trinity	41	1987	field mapping
DeSoto	Biloxi	23	1985	1500' circle
DeSoto	Black Creek	25	1985	1500' circle
DeSoto	Chickasawhay	27	1985	1500' circle
Francis Marion	Wambaw	232	1986	1500'/nest site
Francis Marion	Witherbee	277	1987	1500'/nest site
Homochitto	Bude	15	1987	1500' circle
Homochitto	Homochitto	50	1985	1500' circle
none	Tombigbee	3	1985	unknown
none	Uwharrie	25	1974	unknown
Oakmulgee	Oakmulgee	325	1987	1500' circle
Ocala	Lake George	42	1987	1/4 /field map
Ocala	Seminole	19	1987	1/4 /field map
Oconee	Hitchiti	13	1986	nest site
Oconee	Oconee	10	1985	field mapping
Osceola	Osceola	98	1987	field mapping
Ouachita	Cold Springs	1	1986	nest site
Ouachita	Fourche	1	1987	
Ouachita	Mena	2	1987	nest site
Ouachita	Poteau	16	1986	cavity/nest site
Sam Houston	Raven	185	1986	1500'/field map
Sam Houston	San Jacinto	56	1985	1500'/field map
Savannah River	SRFS	21	1987	nest site
Sumter	Edgefield	10	1985	unknown
Sumter	Enoree	1	1980	unknown
Sumter	Long Cane	2	1980	unknown
Sumter	Tyger	1	1986	unknown
Talladega	Shoal Creek	67	1986	1500' circle
Talladega	Talladega	75	1983	1500' circle
Tuskegee	Tuskegee	2	1986	nest site
Ver-Evang-Kisatchie	Evangeline	52	1986	1500' circle
Ver-Evang-Kisatchie	Kisatchie	104	1986	1500'/nest site
Ver-Evang-Kisatchie	Vernon	210	1987	1500'/nest site

EXTENT OF COLONY SURVEY

Appendix III

A1 RCW POPULATION	A3 DISTRICT	B2 UNSURVEYED	B4 % TRAVERSED
Angelina-Sabine	Angelina	yes	15
Angelina-Sabine	Tenaha	no	85
Angelina-Sabine	Yellowpine	no	90
Apalachicola	Apalachicola	42000	70
Apalachicola	Wakulla	4900	75
Bankhead	Bankhead	no	0
Bienville	Bienville	no	100
Bienville	Strong River	45000	25
Caney	Caney	no	0
Catahoula-Winn	Catahoula	no	10
Catahoula-Winn	Winn	unknown	10
Cherokee	Ocoee	14500	0
Conecuh	Conecuh	no	90
Croatan	Croatan	no	80
Danial Boone	London	19679	0
Danial Boone	Somerset	9020	0
Danial Boone	Stearns	18248	0
Davy Crockett	Neches	yes	5
Davy Crockett	Trinity	yes	5
DeSoto	Biloxi	no	
DeSoto	Black Creek	12000	
DeSoto	Chickasawhay	no	
Francis Marion	Wambaw	no	100
Francis Marion	Witherbee	no	100
Homochitto	Bude	78356	6
Homochitto	Homochitto	10000	10
none	Tombigbee	no	0
none	Uwharrie	no	
Oakmulgee	Oakmulgee	no	90
Ocala	Lake George	no	80
Ocala	Seminole	yes	80
Oconee	Hitchiti	1500	0
Oconee	Oconee	5000	0
Osceola	Osceola	5920	94
Ouachita	Cold Springs	no	0
Ouachita	Fourche		
Ouachita	Mena	yes	unknown
Ouachita	Poteau	100000	0
Sam Houston	Raven	62400	1
Sam Houston	San Jacinto	33000	1
Savannah River	SRFS	no	100
Sumter	Edgefield	no	30
Sumter	Enoree	no	0
Sumter	Long Cane	no	10
Sumter	Tyger	no	
Talladega	Shoal Creek	10000	10
Talladega	Talladega	no	100
Tuskegee	Tuskegee	no	0
Ver-Evang-Kisatchie	Evangeline	no	0
Ver-Evang-Kisatchie	Kisatchie	10000	25
Ver-Evang-Kisatchie	Vernon	1800	90

ADJACENT POPULATION SUMMARY

Appendix III

A1 RCW POPULATION	A3 DISTRICT	B11.1 ADJ.DISTRICT	B11FS DISTANCE
Angelina-Sabine	Angelina	Yellowpine	20
Angelina-Sabine	Tenaha	Yellowpine	23
Angelina-Sabine	Yellowpine	Tenaha	23
Apalachicola	Apalachicola	Wakulla	2
Apalachicola	Wakulla	Apalachicola	2
Bankhead	Bankhead	Oakmulgee	70
Bienville	Bienville	Chickasawhay	63
Bienville	Strong River	Bienville	6
Caney	Caney	Winn	35
Catahoula-Winn	Catahoula	Winn	2
Catahoula-Winn	Winn	Catahoula	2
Cherokee	Ocoee	Stearns	115
Conecuh	Conecuh	Oakmulgee	110
Croatan	Croatan	Wambaw	150
Danial Boone	London	Somerset	6
Danial Boone	Somerset	London	6
Danial Boone	Stearns	Somerset	9.5
Davy Crockett	Neches	Trinity	2
Davy Crockett	Trinity	Neches	2
DeSoto	Biloxi	Black Creek	22
DeSoto	Black Creek	Biloxi	22
DeSoto	Chickasawhay	Black Creek	29
Francis Marion	Wambaw	Witherbee	1
Francis Marion	Witherbee	Wambaw	1
Homochitto	Bude	Homochitto	2
Homochitto	Homochitto	Bude	2
none	Tombigbee	Bienville	50
none	Uwharrie	Witherbee	150
Oakmulgee	Oakmulgee	Talladega	60
Ocala	Lake George	Seminole	23
Ocala	Seminole	Lake George	23
Oconee	Hitchiti	Oconee	9
Oconee	Oconee	Hitchiti	9
Osceola	Osceola	Lake George	75
Ouachita	Cold Springs	Poteau	5
Ouachita	Fourche		
Ouachita	Mena	Poteau	3
Ouachita	Poteau	Mena	3
Sam Houston	Raven	San Jacinto	7
Sam Houston	San Jacinto	Raven	7
Savannah River	SRFS	Wambaw	100
Sumter	Edgefield	SRFS	25
Sumter	Enoree	Witherbee	100
Sumter	Long Cane	SRFS	100
Sumter	Tyger	Witherbee	120
Talladega	Shoal Creek	Talladega	30
Talladega	Talladega	Shoal Creek	30
Tuskegee	Tuskegee	Talladega	80
Ver-Evang-Kisatchie	Evangeline	Vernon	12
Ver-Evang-Kisatchie	Kisatchie	Evangeline	18
Ver-Evang-Kisatchie	Vernon	Evangeline	10

ADJACENT POPULATION SUMMARY

Appendix III

A1 RCW POPULATION	A3 DISTRICT	B12 ADJ.	B13 AGENCY	B14 DIST	B15 NUM
Angelina-Sabine	Angelina	yes	private	5	4
Angelina-Sabine	Tenaha	unknown			
Angelina-Sabine	Yellowpine	unknown			
Apalachicola	Apalachicola	yes	State	8	unknown
Apalachicola	Wakulla	yes	State	6	1
Bankhead	Bankhead	unknown			
Bienville	Bienville	yes	private	3	5
Bienville	Strong River	yes	private	10	4
Caney	Caney	unknown			
Catahoula-Winn	Catahoula	unknown			
Catahoula-Winn	Winn	unknown			
Cherokee	Ocoee	no			
Conecuh	Conecuh	yes	private	.25	3
Croatan	Croatan	yes	Camp Lejeune	15	unknown
Danial Boone	London	no			
Danial Boone	Somerset	no			
Danial Boone	Stearns	no			
Davy Crockett	Neches	yes	private	6	2
Davy Crockett	Trinity	yes	private	14	2
DeSoto	Biloxi	yes	Univ. MS	2	3
DeSoto	Black Creek	yes	Army COE	8	1
DeSoto	Chickasawhay	no			
Francis Marion	Wambaw	yes	SCWMFRD,USC,DOD	.25/20	1/29
Francis Marion	Witherbee	yes	Westvaco/USNavy	5/17	24
Homochitto	Bude	unknown			
Homochitto	Homochitto	yes	private	1	1
none	Tombigbee	yes	Noxubee NWR	10	30
none	Uwharrie	unknown			
Oakmulgee	Oakmulgee	yes	private	1	1
Ocala	Lake George	yes	private	.5	1
Ocala	Seminole	no			
Oconee	Hitchiti	yes	Piedmont NWR	1	27
Oconee	Oconee	yes	Piedmont NWR	6	27
Osceola	Osceola	no			
Ouachita	Cold Springs	no			
Ouachita	Fourche				
Ouachita	Mena	unknown			
Ouachita	Poteau	no			
Sam Houston	Raven	yes	private	8	1
Sam Houston	San Jacinto	yes	private	8	1
Savannah River	SRFS	yes	private	12	1
Sumter	Edgefield	unknown			
Sumter	Enoree	no			
Sumter	Long Cane	no			
Sumter	Tyger	no			
Talladega	Shoal Creek	no			
Talladega	Talladega	unknown			
Tuskegee	Tuskegee	yes	private	20	unknown
Ver-Evang-Kisatchie	Evangeline	unknown			
Ver-Evang-Kisatchie	Kisatchie	yes	Army	5/17	10/25
Ver-Evang-Kisatchie	Vernon	yes	Army/pvt	1/1	70/3

COLONY SURVEY SUMMARY

RCW POPULATION	DISTRICT	SURVEY	NUMBER SUR	NUMBER ACT	SURVEYOR
Angelina-Sabine	Angelina	1986	61	26	R.Conner
Angelina-Sabine	Angelina	1985	60	26	R.Conner
Angelina-Sabine	Angelina	1984	59	34	R.Conner
Angelina-Sabine	Angelina	1983	59	38	R.Conner
Angelina-Sabine	Tenaha	1986	12	4	M.Robertson
Angelina-Sabine	Tenaha	1985	3	2	Stine
Angelina-Sabine	Tenaha	1983	2	0	Pike
Angelina-Sabine	Tenaha	1981	25	8	Pike
Angelina-Sabine	Tenaha	1980	24	11	Pike
Angelina-Sabine	Tenaha	1979	26	11	Pike
Angelina-Sabine	Tenaha	1978	23	17	Pike
Angelina-Sabine	Tenaha	1977	16	12	Pike
Angelina-Sabine	Tenaha	1976	11	7	unknown
Angelina-Sabine	Tenaha	1975	10	6	unknown
Angelina-Sabine	Tenaha	1974	6	4	unknown
Angelina-Sabine	Tenaha	1973	6	4	unknown
Angelina-Sabine	Tenaha	1972	2	1	unknown
Angelina-Sabine	Tenaha	1971	1	1	unknown
Angelina-Sabine	Yellowpine	1986	34	8	M.Robertson
Angelina-Sabine	Yellowpine	1985	1	0	C.Ferguson
Angelina-Sabine	Yellowpine	1982	6	1	C.Ferguson
Angelina-Sabine	Yellowpine	1981	4	2	C.Ferguson
Angelina-Sabine	Yellowpine	1979	2	1	C.Ferguson
Angelina-Sabine	Yellowpine	1978	3	2	C.Ferguson
Angelina-Sabine	Yellowpine	1976	4	3	C.Ferguson
Apalachicola	Apalachicola	1986	35	23	M.Balboni
Apalachicola	Apalachicola	1985	195	159	Balboni/contract
Apalachicola	Apalachicola	1984	88	55	M.Balboni
Apalachicola	Apalachicola	1981	156	112	contract
Apalachicola	Wakulla	1985	73	41	Balboni/contract
Apalachicola	Wakulla	1984	30	20	M.Balboni
Apalachicola	Wakulla	1983	22	10	M.Balboni
Apalachicola	Wakulla	1982	12	10	M.Balboni
Apalachicola	Wakulla	1981	45	33	contract
Bankhead	Bankhead	1986	4	1	G.Gaines
Bankhead	Bankhead	1985	5	1	G.Gaines
Bankhead	Bankhead	1984	9	4	Gaines/Sell
Bankhead	Bankhead	1983	12	4	Sell
Bienville	Bienville	1986	55	39	D.Daniel
Bienville	Bienville	1985	26	16	D.Daniel
Bienville	Bienville	1984	54	29	D.Hancock
Bienville	Bienville	1983	69	49	D.Hancock
Bienville	Bienville	1982	78	54	D.Hancock
Bienville	Bienville	1981	33	29	D.Hancock
Bienville	Bienville	1980	35	26	D. Hancock
Bienville	Bienville	1979	46	42	K.Carpenter
Bienville	Bienville	1978	55	42	K.Carpenter
Bienville	Bienville	1977	19	18	unknown

RCW POPULATION	DISTRICT	SURVEY	NUMBER SUR	NUMBER ACT	SURVEYOR
Bienville	Strong River	1986	5	0	D.Daniel
Bienville	Strong River	1985	7	0	D.Daniel
Bienville	Strong River	1983	10	2	D.Hancock
Bienville	Strong River	1981	10	3	M.Hayman
Caney	Caney	1986	2	0	R.Costa
Catahoula-Winn	Catahoula	1986	59	42	J.Hogan
Catahoula-Winn	Catahoula	1975	42	40	R.Bonar
Conecuh	Conecuh	1983	51	32	LeMaire/McGowin
Conecuh	Conecuh	1980	51	40	L.Hedrick
Conecuh	Conecuh	1979	25	20	Adams
Conecuh	Conecuh	1978	25	20	Adams
Croatan	Croatan	1984	28	21	GSC
Croatan	Croatan	1983	19	15	GSC
Croatan	Croatan	1981	56	43	BK
Croatan	Croatan	1980	54	41	LN
Croatan	Croatan	1979	52	39	LN
Croatan	Croatan	1978	50	43	unknown
Croatan	Croatan	1977	45	34	unknown
Danial Boone	London	1986	12	2	K.Spielman
Danial Boone	London	1985	13	6	K.Spielman
Danial Boone	London	1983	14	7	Hurst
Danial Boone	London	1982	10	7	Hurst
Danial Boone	London	1981	6	2	unknown
Danial Boone	Somerset	1986	8	3	K.Spielman
Danial Boone	Somerset	1985	8	4	K.Spielman
Danial Boone	Somerset	1984	9	4	Hurst
Danial Boone	Somerset	1983	9	6	Hurst
Danial Boone	Somerset	1982	9	4	Hurst
Danial Boone	Somerset	1981	7	3	Turner
Danial Boone	Somerset	1980	5	2	Schmaltz
Danial Boone	Stearns	1986	4	2	Spielman/Kaderav
Danial Boone	Stearns	1985	4	2	Spielman/Kaderav
Danial Boone	Stearns	1984	3	2	Hurst/McGrew
Danial Boone	Stearns	1983	3	1	Hurst/McGrew
Danial Boone	Stearns	1982	2	1	McGrew
Danial Boone	Stearns	1981	2	2	unknown
Davy Crockett	Neches	1986	26	8	Mize
Davy Crockett	Neches	1983	69	42	unknown
Davy Crockett	Neches	1982	69	44	C.Gober
Davy Crockett	Neches	1981	63	43	C.Gober
Davy Crockett	Neches	1980	51	40	C.Gober
Davy Crockett	Neches	1979	39	29	unknown
Davy Crockett	Neches	1978	38	33	unknown
DeSoto	Biloxi	1985	23	9	H.Pawelczyk
DeSoto	Biloxi	1983	33	9	B.Knowles
DeSoto	Biloxi	1982	10	6	unknown
DeSoto	Biloxi	1981	36	15	unknown
DeSoto	Biloxi	1980	37	16	unknown

COLONY SURVEY SUMMARY

RCW POPULATION	DISTRICT	SURVEY	NUMBER SUR	NUMBER ACT	SURVEYOR
DeSoto	Biloxi	1979	17	6	unknown
DeSoto	Biloxi	1978	35	19	unknown
DeSoto	Biloxi	1976	25	19	unknown
DeSoto	Black Creek	1985	25	5	H.Pawelczyk
DeSoto	Black Creek	1984	35	7	B.Knowles
DeSoto	Black Creek	1983	51	10	B.Knowles
DeSoto	Black Creek	1982	3	2	unknown
DeSoto	Black Creek	1981	9	7	unknown
DeSoto	Black Creek	1980	27	20	unknown
DeSoto	Black Creek	1979	7	7	unknown
DeSoto	Black Creek	1978	35	30	unknown
DeSoto	Black Creek	1977	13	10	unknown
DeSoto	Black Creek	1976	22	20	unknown
DeSoto	Chickasawhay	1985	27	11	H.Pawelczyk
DeSoto	Chickasawhay	1983	46	11	B.Knowles
DeSoto	Chickasawhay	1981	16	9	unknown
DeSoto	Chickasawhay	1980	31	21	S.Duzan
DeSoto	Chickasawhay	1979	8	7	unknown
DeSoto	Chickasawhay	1978	13	13	unknown
DeSoto	Chickasawhay	1977	2	1	unknown
DeSoto	Chickasawhay	1976	20	15	unknown
Francis Marion	Wambaw	1986	45	45	Carlson
Francis Marion	Wambaw	1985	15	14	Carlson
Francis Marion	Wambaw	1984	16	15	Carlson
Francis Marion	Wambaw	1983	28	25	Carlson
Francis Marion	Wambaw	1982	22	21	Carlson
Francis Marion	Wambaw	1981	52	51	Carlson
Francis Marion	Wambaw	1980	27	27	Carlson
Francis Marion	Wambaw	1979	23	22	Carlson
Francis Marion	Wambaw	1978	17	16	Carlson
Francis Marion	Wambaw	1977	96	80	Jones
Francis Marion	Wambaw	1976	70	60	Mudge
Francis Marion	Wambaw	1975	40	34	Mudge
Francis Marion	Witherbee	1986	47	44	Krusac/Dupre/et.
Francis Marion	Witherbee	1985	37	36	Tyler/Dupre/et.a
Francis Marion	Witherbee	1984	29	29	Tyler/Dupre/et.a
Francis Marion	Witherbee	1983	44	41	Tyler/Dupre/et.a
Francis Marion	Witherbee	1982	76	72	Tyler/Dupre/et.a
Francis Marion	Witherbee	1981	71	67	Tyler/Dupre/et.a
Francis Marion	Witherbee	1980	55	53	Tyler/Dupre/et.a
Francis Marion	Witherbee	1979	80	73	Tyler/Dupre/et.a
Homochitto	Bude	1985	10	7	D.Hancock
Homochitto	Bude	1982	18	10	T.Coppinger
Homochitto	Bude	1976	9	9	J.Jackson
Homochitto	Homochitto	1986	38	21	D.Hancock
Homochitto	Homochitto	1985	25	13	D.Hancock
Homochitto	Homochitto	1983	26	19	T.Coppinger
Homochitto	Homochitto	1982	9	6	T.Coppinger

COLONY SURVEY SUMMARY

RCW POPULATION	DISTRICT	SURVEY	NUMBER SUR	NUMBER ACT	SURVEYOR
Homochitto	Homochitto	1980	2	2	J.Horn
Homochitto	Homochitto	1978	4	3	J.Horn
Homochitto	Homochitto	1977	45	45	J.Horn
Homochitto	Homochitto	1976	7	6	J.Horn
none	Enoree	1980	1	0	B.Harrell
none	Enoree	1975	1	0	B.Harrell
none	Enoree	1970	1	0	unknown
none	SRFS	1986	21	3	M.Lenartz
none	SRFS	1985	29	5	F.Brooks
none	SRFS	1984	29	5	M.Lenartz
none	SRFS	1983	16	5	M.Lenartz
none	Tombigbee	1980	3	0	Wilder
none	Tyger	1978	1	0	O.Stewart
none	Uwharrie	1978	25	0	B.Lee
none	Uwharrie	1974	25	1	B.Sanders
Oakmulgee	Oakmulgee	1986	125	54	Oliver
Oakmulgee	Oakmulgee	1985	27	17	Oliver
Oakmulgee	Oakmulgee	1984	17	10	Oliver
Oakmulgee	Oakmulgee	1983	224	161	Ballard/Oneal
Oakmulgee	Oakmulgee	1982	90	25	Hooper
Oakmulgee	Oakmulgee	1981	47	31	contract survey
Oakmulgee	Oakmulgee	1980	57	22	Dilworth
Oakmulgee	Oakmulgee	1979	79	57	Dilworth
Oakmulgee	Oakmulgee	1978	130	100	Hafner
Oakmulgee	Oakmulgee	1977	97	78	Hudson
Ocala	Lake George	1986	41	18	Elsen/district p
Ocala	Lake George	1985	37	14	M.Robertson
Ocala	Lake George	1981	6	6	contract
Ocala	Seminole	1986	19	3	Simpkins
Ocala	Seminole	1985	18	4	M.bertson
Ocala	Seminole	1981	5	1	contract
Ocala	Seminole	1979	17	8	Loweryns
Oconee	Hitchiti	1986	12	10	Lennartz/Dashlet
Oconee	Hitchiti	1985	12	10	Lennartz/Dashlet
Oconee	Hitchiti	1984	12	10	Lennartz/Dashlet
Oconee	Hitchiti	1983	12	10	Lennartz/Dashlet
Oconee	Hitchiti	1979	3	3	R.Anders
Oconee	Hitchiti	1978	10	8	R.Anders
Oconee	Oconee	1986	1	1	W.Guhtrie
Oconee	Oconee	1985	2	2	K.Wooster
Oconee	Oconee	1984	3	0	B.Sanders
Oconee	Oconee	1983	14	0	R.Anders
Oconee	Oconee	1982	10	0	B.Sanders
Oconee	Oconee	1981	8	0	B.Sanders
Oconee	Oconee	1979	14	1	R.Anders
Oconee	Oconee	1977	2	0	D.Watson
Oconee	Oconee	1976	1	1	W.Guhtrie
Osceola	Osceola	1986	25	17	Kett

COLONY SURVEY SUMMARY

RCW POPULATION	DISTRICT	SURVEY	NUMBER SUR	NUMBER ACT	SURVEYOR
Osceola	Osceola	1985	45	25	Robertson/Couch
Osceola	Osceola	1984	45	25	Robertson/Couch
Osceola	Osceola	1983	45	25	Kett
Osceola	Osceola	1982	45	25	unknown
Osceola	Osceola	1981	45	25	unknown
Osceola	Osceola	1980	45	25	unknown
Ouachita	Cold Springs	1986	1	1	Bastion
Ouachita	Cold Springs	1985	1	1	Bastion
Ouachita	Cold Springs	1984	1	1	Bastion
Ouachita	Cold Springs	1983	2	0	Bastion
Ouachita	Cold Springs	1982	2	0	Bastion
Ouachita	Cold Springs	1981	2	0	Bastion
Ouachita	Cold Springs	1980	2	0	Bastion
Ouachita	Mena	1986	1	1	Mawk
Ouachita	Mena	1985	1	1	Mawk
Ouachita	Mena	1984	1	1	Mawk
Ouachita	Mena	1983	1	1	Mawk
Ouachita	Mena	1982	1	1	Mawk
Ouachita	Mena	1981	1	1	Mawk
Ouachita	Mena	1980	1	1	Mawk
Ouachita	Mena	1979	1	1	Stahlecker
Ouachita	Mena	1978	1	1	Stahlecker
Ouachita	Mena	1977	1	1	Stahlecker
Ouachita	Mena	1975	1	1	unknown
Ouachita	Mena	1974	1	1	unknown
Ouachita	Mena	1974	1	1	unknown
Ouachita	Mena	1973	1	1	unknown
Ouachita	Mena	1972	1	1	unknown
Ouachita	Mena	1971	1	1	unknown
Ouachita	Mena	1970	1	1	unknown
Ouachita	Poteau	1986	16	16	Montague
Ouachita	Poteau	1985	9	9	Montague
Ouachita	Poteau	1984	10	10	Montague
Ouachita	Poteau	1983	8	8	Montague
Ouachita	Poteau	1982	12	12	Montague
Ouachita	Poteau	1981	6	6	Montague
Ouachita	Poteau	1980	16	13	D.Urbston
Sam Houston	Raven	1986	24	14	J.Davis
Sam Houston	Raven	1985	59	25	J.Davis
Sam Houston	Raven	1984	32	18	J.Davis
Sam Houston	Raven	1983	43	18	J.Davis
Sam Houston	Raven	1982	55	41	J.Davis
Sam Houston	Raven	1981	48	33	J.Davis
Sam Houston	Raven	1980	17	10	J.Davis
Sam Houston	Raven	1979	35	32	J.Davis
Sam Houston	Raven	1978	41	31	J.Davis
Sam Houston	Raven	1977	35	33	J.Davis
Sam Houston	Raven	1976	39	32	J.Davis

RCW POPULATION	DISTRICT	SURVEY	NUMBER SUR	NUMBER ACT	SURVEYOR
Sam Houston	Raven	1975	4	3	J.Davis
Sam Houston	Raven	1974	1	0	J.Davis
Sam Houston	Raven	1973	4	3	J.Davis
Sam Houston	Raven	1972	1	1	J.Davis
Sam Houston	Raven	1971	3	3	J.Davis
Sam Houston	Raven	1970	3	3	J.Davis
Sam Houston	San Jacinto	1986	5	4	J.Davis
Sam Houston	San Jacinto	1985	19	10	R.Mize
Sam Houston	San Jacinto	1984	13	8	R.Mize
Sam Houston	San Jacinto	1983	22	14	R.Mize
Sam Houston	San Jacinto	1982	31	19	R.Mize
Sam Houston	San Jacinto	1981	12	10	R.Mize
Sam Houston	San Jacinto	1980	4	3	unknown
Sam Houston	San Jacinto	1979	1	1	unknown
Sumter	Edgefield	1986	9	0	Brooks/Foster/Fe
Sumter	Edgefield	1985	10	0	D.Ray
Sumter	Edgefield	1984	11	2	D.Ray
Sumter	Edgefield	1983	11	2	D.Ray
Sumter	Edgefield	1982	11	2	D.Ray
Sumter	Edgefield	1981	11	2	D.Ray
Sumter	Edgefield	1980	11	2	D.Ray
Sumter	Edgefield	1975	9	4	D.Ray
Talladega	Shoal Creek	1986	3	1	L.Hedrick
Talladega	Shoal Creek	1984	2	1	Oliver
Talladega	Shoal Creek	1983	63	6	Oliver
Talladega	Shoal Creek	1982	1	1	Oliver
Talladega	Shoal Creek	1981	13	0	Baker/Nelson/Rob
Talladega	Shoal Creek	1980	5	1	Sampson/Oliver
Talladega	Shoal Creek	1979	39	0	Walker
Talladega	Shoal Creek	1978	35	0	Walker
Talladega	Talladega	1986	15	5	D.Lyons
Talladega	Talladega	1985	18	14	J.Powers
Talladega	Talladega	1983	75	14	J.Powers
Talladega	Talladega	1982	2	1	marking crew
Talladega	Talladega	1981	1	1	Baker
Talladega	Talladega	1980	18	8	Eakes/YACC/Morri
Talladega	Talladega	1979	14	8	YCC/Eakes/markin
Tuskegee	Tuskegee	1986	2	1	Banker/Mirarchi
Tuskegee	Tuskegee	1983	5	1	Mirarchi
Tuskegee	Tuskegee	1980	3	2	Sampson/Hunt
Tuskegee	Tuskegee	1979	3	1	Morris
Ver-Evang-Kisat	Evangeline	1986	52	50	D.Cutts
Ver-Evang-Kisat	Evangeline	1976	31	31	A.Womack
Ver-Evang-Kisat	Kisatchie	1986	89	68	Costa/Hogan
Ver-Evang-Kisat	Kisatchie	1981	80	unknown	S.Scott
Ver-Evang-Kisat	Kisatchie	1975	90	unknown	Morrison
Ver-Evang-Kisat	Vernon	1986	31	24	Lane
Ver-Evang-Kisat	Vernon	1985	32	18	Lane/Paris
Ver-Evang-Kisat	Vernon	1984	31	unknown	R.Murray
Ver-Evang-Kisat	Vernon	1975	173	unknown	unknown

COLONY MONITORING SUMMARY

Appendix IV

A1 RCW POPULATION	A3 DISTRICT	C1 STATUS SURVEY	C2 # MULT 1980	C3 # MULT 1970
Angelina-Sabine	Angelina	yes	60	unknown
Angelina-Sabine	Tenaha	yes	14	26
Angelina-Sabine	Yellowpine	yes	11	20
Apalachicola	Apalachicola	yes	51	51
Apalachicola	Wakulla	yes	32	32
Bankhead	Bankhead	yes	12	12
Bienville	Bienville	yes	106	176
Bienville	Strong River	yes	10	10
Caney	Caney	yes	2	2
Catahoula-Winn	Catahoula	yes	59	78
Catahoula-Winn	Winn	no	0	unknown
Conecuh	Conecuh	yes	51	51
Croatan	Croatan	yes	54	54
Danial Boone	London	yes	12	12
Danial Boone	Somerset	yes	9	9
Danial Boone	Stearns	yes	4	4
Davy Crockett	Neches	yes	71	71
Davy Crockett	Trinity	yes	unknown	unknown
DeSoto	Biloxi	yes	37	49
DeSoto	Black Creek	yes	43	46
DeSoto	Chickasawhay	yes	43	47
Francis Marion	Wambaw	yes	27	200
Francis Marion	Witherbee	yes	105	259
Homochitto	Bude	yes	17	20
Homochitto	Homochitto	yes	37	57
none	Ocoee	yes	0	0
none	SRFS	yes	29	29
none	Tombigbee	yes	0	0
Oakmulgee	Oakmulgee	yes	125	400
Ocala	Lake George	yes	37	37
Ocala	Seminole	yes	18	18
Oconee	Hitchiti	yes	12	12
Oconee	Oconee	yes	3	14
Osceola	Osceola	yes	98	98
Ouachita	Cold Springs	yes	3	unknown
Ouachita	Mena	yes	1	unknown
Ouachita	Poteau	yes	16	26
Sam Houston	Raven	yes	unknown	unknown
Sam Houston	San Jacinto	yes	unknown	unknown
Sumter	Edgefield	yes	10	9
Talladega	Shoal Creek	yes	17	65
Talladega	Talladega	yes	18	75
Tuskegee	Tuskegee	yes	4	6
Ver-Evang-Kisat	Evangeline	yes	0	31
Ver-Evang-Kisat	Kisatchie	yes	18	18
Ver-Evang-Kisat	Vernon	yes	46	46

COLONY MONITORING SUMMARY

Appendix IV

A1 RCW POPULATION	A3 DISTRICT	C4 # CONF	C5 # CLAN	C6 # NEST	C7 # FLEGING
Angelina-Sabine	Angelina	26	0	11	unknown
Angelina-Sabine	Tenaha	0	0	0	0
Angelina-Sabine	Yellowpine	2	0	1	0
Apalachicola	Apalachicola	31	0	8	0
Apalachicola	Wakulla	8	0	2	0
Bankhead	Bankhead	1	0	0	0
Bienville	Bienville	5	0	5	0
Bienville	Strong River	0	0	0	0
Caney	Caney	0	0	0	0
Catahoula-Winn	Catahoula	42	0	15	0
Catahoula-Winn	Winn	0	0	0	0
Conecuh	Conecuh	4	0	3	3
Croatan	Croatan	0	0	0	0
Danial Boone	London	1	0	1	0
Danial Boone	Somerset	0	0	0	0
Danial Boone	Stearns	1	0	0	0
Davy Crockett	Neches	0	0	0	0
Davy Crockett	Trinity	3	0	1	0
DeSoto	Biloxi	4	0	2	0
DeSoto	Black Creek	2	0	1	0
DeSoto	Chickasawhay	2	0	1	0
Francis Marion	Wambaw	45	0	45	0
Francis Marion	Witherbee	15	0	1	0
Homochitto	Bude	0	0	0	0
Homochitto	Homochitto	3	0	0	0
none	Ocoee	0	0	0	0
none	SRFS	3	3	2	2
none	Tombigbee				
Oakmulgee	Oakmulgee	50	0	5	0
Ocala	Lake George	8	0	2	0
Ocala	Seminole	3	0	1	0
Oconee	Hitchiti	10	9	10	10
Oconee	Oconee	1	0	0	0
Osceola	Osceola	39	0	0	0
Ouachita	Cold Springs	1	0	1	0
Ouachita	Mena	1	1	1	1
Ouachita	Poteau	16	0	4	0
Sam Houston	Raven	5	0	3	0
Sam Houston	San Jacinto	3	0	0	0
Sumter	Edgefield	0	0	0	0
Talladega	Shoal Creek	1	0	0	0
Talladega	Talladega	1	0	0	0
Tuskegee	Tuskegee	0	0	0	0
Ver-Evang-Kisat	Evangeline	0	0	0	0
Ver-Evang-Kisat	Kisatchie	68	10	24	0
Ver-Evang-Kisat	Vernon	25	0	25	0

RCW DATA SHEET

The primary objective of this data sheet is to assimilate the data needed to determine the general status of population monitoring, habitat management, habitat availability, and chapter implementation on a population basis across the Region. The information gathered will be used to develop a Regional RCW Habitat Management strategy, including budget proposals.

INSTRUCTIONS

Complete a separate data sheet for each Forest Service Ranger District. Answer all questions. If you don't know the answer, so note. The answer sheets provided are number keyed to this instruction sheet. Please complete these answer sheets on the DG. Continue on a separate page if there is insufficient room on the answer sheet for any of your answers.

A. GENERAL

Identify:

1. The name of the RCW population this Ranger District is part of. Refer to the table on page 420.2--2 of FSH 2609.23R for the list of names.

2. Use the proclaimed National Forest name.

3. The name of the Ranger District the data represents.

4. The name of the state the Ranger District is found in.

5. The name of the geographic province the Ranger District is found in; i.e., lower coastal plain, upper coastal plain, piedmont, interior highlands, Appalachian highlands, valley and ridge.

6. The name of the individual actually completing this data sheet.

7. The phone number of the person completing this data sheet.

8. The date this data sheet was completed.

B. RCW POPULATION DATA

1. Based on your most recent maps, what is the total number of RCW colonies on the District? In parenthesis identify through what year the data is valid.

2. Are there any areas on the District considered suitable for RCW which have not been searched for colonies? If yes, identify size of area in acres in parenthesis.

3. What method was used to aggregate the cavity trees into colonies; i.e., 1500 ft. circle, 460 meter circle, subjective field mapping, actual nest site observations, other (identify), and who did it?

4. What percent of the area considered suitable for RCW have been systematically traversed with colony search transects?

3.

4.

5.

6.

5. Identify what confidence you have in the colony estimate; i.e., excellent, good, fair, poor, none. Support your rating with a narrative, if you feel the estimate is biased, identify if its too high, etc., and why.

6. How many of the colonies are currently active? In parenthesis, identify through what year the data is valid.

7. What method was used to determine active status; i.e., ocular estimate of cavity tree status, presence of birds, actual confirmation of nesting, other (identify), and who did it?

8. Identify what confidence you have in the active colony estimate; i.e., excellent, good, fair, poor, none. Support your rating with a narrative, if you feel the estimate is biased, identify if its too high, etc. and why.

9. In your opinion what is the population trend; i.e., increasing, stable, or decreasing. Support your answer with a narrative.

10. What is the District's RCW population objective?

11. What is the distance (miles) from the District's colonies to the closest active RCW colony on other FS lands. Identify what Ranger District.

12. Are there RCW colonies outside of National Forest lands within 20 miles of the District's colonies?

13. If yes to #12, identify land management agency responsible for colonies (if private, just identify as private).

14. If yes to #12, distance from District's colonies to off FS population (miles).

15. If yes to #12, number of RCW colonies involved in off FS population.

C. POPULATION MONITORING

1. What number of known colonies have been checked for active status since 1970? Record the number of colonies surveyed, the number found to be active, surveyor's name, and estimate of survey reliability (excellent, good, fair, poor, unknown) by year on the table provided..

2. What number of colonies have been checked for active status more than once since 1980?

3. What number of colonies have been checked for active status more than once since 1970?

4. What number of colonies do you have confirmed active status based on observations of birds for 1985 or 1986?

5. What number of colonies do you know the 1985 or 1986 clan size?

6. What number of colonies do you have confirmed nesting based on adults bringing food to the nest, or eggs layed, or young present for 1985 or 1986?

7. What number of colonies do you know the number of young fledged for 1985 or 1986?

D. RCW HABITAT DATA

1. Attach the District's age class distribution table for pine and pine-hardwood forest management types.

2. What was the total acres of pine and pine-hardwood forest type used to determine the District's RCW population objectives in the Forest Plan?

3. What is the number of compartments with RCW colonies identified?

4. What is the total number of compartments with RCW management requirements, including recruitment stands and foraging habitats.

5. What is the total number of compartments on the District?

6. What is the maximum number of RCW colonies in a compartment?

7. How many compartments exceed a 4 active RCW colony density?

8. Are there any areas on the District which appear suitable, but do not have RCW's?

9. If yes to #8, identify size of area in acres and distance to nearest active colony. Include any comments on why it hasn't been colonized.

10. Are there any areas on the District which recent RCW expansion has occurred?

11. If yes to #10, identify distance from nearest active colony and a descriptive narrative.

E. RCW HABITAT MANAGEMENT

1. What is needed in habitat improvement work to keep hardwood stocking at less than 20 sq.ft/acre basal area within colony site and remove all hardwood stems greater than 1 inch dbh within 50 feet of cavity trees on all active colonies. Identify acres to be treated per year, for how long, how often, and at what cost by treatment in the table provided.

2. Same as above for all recruitment and replacement stands.

3. Describe your current RCW habitat improvement program identifying the colony acres treated per year, current time until colony is treated again (retreatment period) and costs using the table provided.

4. What percent of the mid-story habitat improvement is completed using KV, currently and potentially?

5. What percent of the cavity tree and colony site monumentation work is completed using KV, currently and potentially?

6. What percent of the colony monitoring is completed using KV, currently and potentially?

F. HANDBOOK IMPLEMENTATION

1. What number of RCW colonies are mapped and cavity trees marked per the Handbook guides? If you don't know the actual number, estimate the percentage of total colonies involved.

2. What number of active RCW colonies have replacement stands identified in CISC? If you don't know the actual number, estimate the percentage of total colonies involved.

3. What number of compartments have replacement/recruitment stands identified in CISC? If you don't know the actual number, estimate the percentage of total RCW compartments involved.

4. What number of compartments have foraging habitats identified by stands? If you don't know the actual number, estimate the percentage of total RCW compartments involved.

5. What number of active colonies meet the mid-story hardwood basal area guides (less than 20 sq. ft./acre)? If you don't know the actual number, estimate the percentage of total active colonies involved.

6. What number of recruitment stands meet the mid-story hardwood basal area guides (less than 20 sq. ft./acre)? If you don't know the actual number, estimate the percentage of total recruitment stands involved.

7. What number of active colonies are within the over-story conifer basal area guides (40-80 sq. ft./acre)? If you don't know the actual number, estimate the percentage of total active colonies involved.

8. What number of recruitment stands are within the over-story conifer basal area guides (40-80 sq. ft./acre)? If you don't know the actual number, estimate the percentage of total recruitment stands involved.

9. What number of colonies are isolated from suitable foraging habitats? If you don't know the actual number, estimate the percentage of total colonies involved.

10. What number of colonies are below 125 acres greater than 30 year old pine or pine-hardwood within a .5 mile of the colony site? If you don't know the actual number, estimate the percentage of total colonies involved.

11. What number of colonies are below 50 acres greater than 60 year old pine or pine-hardwood within a .5 mile of the colony site? If you don't know the actual number, estimate the percentage of total colonies involved.

12. What number of colonies were treated with habitat improvement work in 1986? If you don't know the actual number, estimate the percentage of total colonies involved.

13. What number of recruitment stands were treated with habitat improvement work in 1986? If you don't know the actual number, estimate the percentage of total recruitment stands involved.

G. OTHER

1. Would a computer data base be helpful in your RCW work? Explain.

2. Any problems of interpretation or suggested revisions to the RCW Handbook Chapter? Explain.

3. Are you using volunteers, private groups, etc. to help you monitor RCW's? Describe.

4. Any RCW research being conducted or that has occurred in the past on the District? If yes, identify who and when.

5. Any suggested management strategies that have not been identified in the Handbook?

6. Space is provided for any comments you may have.

RCW DATA SHEET

A. GENERAL

1._____
2._____ 3._____
4._____ 5._____
6._____ 7._____ 8._____

B. RCW POPULATION DATA

1._____ 2._____ 3._____
4._____ 5._____
6._____ 7._____
8._____
9._____
10._____ 11._____
12._____ 13._____
14._____ 15._____

C. POPULATION MONITORING

1. (Table)

Year	Number Surveyed	Number Active	Surveyor	Reliability
1986				
1985				
1984				
1983				
1982				
1981				
1980				
1979				
1978				
1977				
1976				
1975				
1974				
1973				
1972				
1971				
1970				

2._____ 3._____ 4._____
5._____ 6._____ 7._____

D. RCW HABITAT DATA

1. Atachment 2._____ 3._____
4._____ 5._____ 6._____
7._____ 8._____ 9._____

10._____ 11._____

E. RCW HABITAT MANAGEMENT

1. (Table)	Burning	Mechanical	Chemical
acres/year			
cost/acre			
retreatment period			

2. (Table)	Burning	Mechanical	Chemical
acres/year			
cost/acre			
retreatment period			

3. (Table)	Burning	Mechanical	Chemical
acres/year			
cost/acre			
retreatment period			

4._____ 5._____ 6._____

F. HANDBOOK IMPLEMENTATION

1._____ 2._____ 3._____ 4.

5._____ 6._____ 7._____ 8.

9._____ 10._____ 11._____ 12.

13._____

G. OTHER

1.

2.